ROUTING AND TRANSMITTAL SLIP Date 11-7-91

TO: (Name, office symbol, room number, building, Agency/Post)	Initials	Date
1. ~~Bill Black, CH2M Hill~~ BB by SB		
2. Don Pizzini		11/18/91
3. John Wardell		11/18/91
4. ~~Pam Hillery~~ ✓		
5.		

Action	File	Note and Return
Approval	For Clearance	Per Conversation
As Requested	For Correction	Prepare Reply
Circulate	✓ For Your Information	See Me
Comment	Investigate	Signature
Coordination	Justify	

REMARKS

Package from Tuesday's review of air quality monitoring, modeling, and "finger printing."

Note: Red tagged items.

SO_2 20,000 - 30,000 tons ambient conc.

Please return to Scott.

DO NOT use this form as a RECORD of approvals, concurrences, disposals, clearances, and similar actions

FROM: (Name, org. symbol, Agency/Post)	Room No.—Bldg.
Scott B.	Phone No.

5041-102

OPTIONAL FORM 41 (Rev. 7-76)
Prescribed by GSA
FPMR (41 CFR) 101-11.206

* U.S. GPO: 1988 — 201-759

Table 1 (Draft)

Summary of Daily and Annual Emissions from ASARCO, East Helena

Source Number	Source Description	(1) Daily Lead Emission (pounds per day)	(2) Annual Lead Emissions (pounds per year)	Percent Annual Lead Emissions
1P	Sample Mill Baghouse Stack	0.0376	13.72	0.02
2P	Laboratory Assay Stack	0.1411	51.50	0.06
3P	Crushing Mill Baghouse Stack #1 Venting Crusher	0.0493	17.99	0.02
3P-a	Crushing Mill Baghouse Stack #1 Venting Sinter	6.1296	2237.30	2.78
4P	Crushing Mill Baghouse Stack #1 Venting Crusher	0.0177	6.46	0.01
4P-a	Crushing Mill Baghouse Stack #1 Venting Sinter	0.1337	48.80	0.06
5P	Crushing Mill Baghouse Stack #3	0.0038	1.39	0.00
6P	Concentrate Storage & Handling Building Baghouse Stack	95.5992	34893.71	43.43
7P	Sinter D&L Baghouse Stack	10.5204	3839.95	4.78
8P	Acid Plant Stack	0.4144	151.26	0.19
9P	Sinter Storage Baghouse Stack	2.0724	756.43	0.94
10P	Tetrahedrite Drier Baghouse Stack	0.0054	1.97	0.00
11P	Kettle Vent #1 and #3	0.2773	101.21	0.13
12P	Kettle Vent #2, #4, and #5	0.4159	151.80	0.19
13P	Kettle Vent #6	0.1386	50.59	0.06
14P	Kettle Vent #7	0.0608	22.19	0.03
15P	Speiss Pit Stack	0.2781	101.51	0.13
16P	Blast Furnace Baghouse Stack	27.8663	10171.20	12.66
17P	Acid Dust Bin Baghouse Stack	1.4110	515.02	0.64
18P	Zinc Furnace Baghouse Stack	0.0000	0.00	0.00
1V	Crushing Mill Area Building Source	1.4900	543.85	0.68
1V-a	Crushing Mill Area Track Hopper	0.2388	87.16	0.11
1V-b	Crushing Mill Area Product Conveyor	0.1200	43.80	0.05
2V	Hopto Unloading and BF BH Dust Handling	0.5094	185.93	0.23
3V	Old Ore Storage Yard	0.7203	262.92	0.33
4V	High Grade Building Dumping Area	0.0004	0.15	0.00
6V	Sinter Building	1.6869	615.72	0.77
7V	Cottrell Penthouse	1.0352	377.85	0.47
8V-a	Breaking Floor Building	0.0981	35.81	0.04

Table 1 (Draft) Continued

Summary of Daily and Annual Emissions from ASARCO, East Helena

Source Number	Source Description	(1) Daily Lead Emission (pounds per day)	(2) Annual Lead Emissions (pounds per year)	Percent Annual Lead Emissions
8V-b	Blast Furnace Charge Building	0.1804	65.85	0.08
8V-f	Sinter Handling by Payloader	5.485	2002.03	2.49
8V-h	Matte Handling by Payloader	0.1855	67.71	0.08
8V-i	Direct Smelt Bins	0.0011	0.40	0.00
8V-k	Transfer of Byproduct Dust to 47 Feeders	1.0039	366.42	0.46
9V	Blast Furnace Feed Floor	3.8127	1391.64	1.73
10V	Blast Furnace Tapping Platform	1.9081	696.46	0.87
11V	Slag Handling Facility	0.7399	270.06	0.34
12V	Slag Pile Dumping	0.7928	289.37	0.36
13V	Dross Plant	37.4318	13662.61	17.01
15V	Speiss Handling Facility	0.0100	3.65	0.00
16V	Transfer of Tetrahedrite to Drier Bin	0.0004	0.15	0.00
17V	Acid Dust Bin Building	0.2992	101.62	0.13
17V-a	Acid Dust Bin Building Conveyor Drop	1.3745	501.69	0.62
18V	Blast Furnace Baghouse Cleanout	0.5780	210.97	0.26
19V	Blast Furnace Flue Cleanout	0.0584	21.32	0.03
20V	Zinc Plant Building	0.0000	0.00	0.00
21V	Zinc Baghouse Building	0.0000	0.00	0.00
1A	Wind Erosion Sources	0.8129	296.71	0.37
2A	Unpaved Roads	0.2935	107.13	0.13
2A	Paved Roads	13.6883	4996.23	6.22
Total		220.1	80339.2	

(1) Average daily lead emissions per source for period of July 1, 1990 to December 31, 1990.

(2) Average daily lead emissions for the base period times 365 days per year.

AGENDA
EAST HELENA LEAD SIP
EPA CONFERENCE CENTER 999 18TH STREET, DENVER, COLORADO
TUESDAY, NOVEMBER 5, 1991

8:30 AM INTRODUCTIONS — EPA, MONTANA, ASARCO

8:45 AM EPA SRAB PHONE TIE-IN FROM RTP, NORTH CAROLINA.

8:50 AM LEAD EMISSION SUMMARY — MONTANA

9:00 AM METEOROLOGICAL DATA — TRC

- NETWORK DESCRIPTION AND DATA COMPLETENESS
- STUDY YEAR CLIMATOLOGICAL SUMMARY
- WORST-CASE DAY SELECTION
- BACKGROUND CONCENTRATION

9:10 AM COMPLEX TERRAIN SCREENING RESULTS — CPP

- METEOROLOGICAL INPUT CHOICE
- POST-PROCESSOR CHOICE
- FINAL COMPLEX TERRAIN DEMONSTRATION

9:25 AM RECONCILIATION AND VERIFICATION PROCESS — KEYSTONE/NEA CPP

- RECONCILIATION PROTOCOL
- CMB SUMMARY
- ISC SUMMARY
- FINAL RECONCILIATION PERFORMANCE
- DISPERSION MODEL/AMBIENT PERORMANCE

10:30 AM ADDITIONAL DISPERSION MODELING UPDATE — CPP

Riskassessm

- DESIGN VALUE DETERMINATION
- VERIFICATION PROCEDURE USING 1ST AND 2ND QTR 1991

11:00 AM SRAB OFF-LINE

11:00 AM - 12:30 PM BREAK

* - Must ove reasonable pd. bet & aft constr.

12:30 PM EMISSION INVENTORY STUDY — NAWC, MONTANA

last AQD
- source of reentr. dust onto paved surfaces.
- storage pile even if not haz.

- ACTUAL EMISSION INVENTORY
- ALLOWABLE EMISSION INVENTORY

2:00 PM PLANNING SESSION — ALL

- WORK REMAINING TO BE DONE
- CONTROL STRATEGY GUIDELINES
- SCHEDULE ADJUSTMENTS

- rev. mon. data for pd. during removal
- contrib. fm paved areas
- fit into model?

* (

next 3-5 yrs? recontam?

3:30 PM ADJOURN

53 tons/yr
35%

Richard Markus - ASARCO Sr. techn. adv.
Gail Hofnagle -
Paul Phillips - Holland & Hart
John Cooper - Keystone

HOLLAND & HART
ATTORNEYS AT LAW

DENVER
DENVER TECH CENTER
COLORADO SPRINGS
ASPEN
BILLINGS
BOISE
CHEYENNE
WASHINGTON, D.C.

SUITE 2900
555 SEVENTEENTH STREET
DENVER, COLORADO 80202-3979
MAILING ADDRESS
P.O. BOX 8749
DENVER, COLORADO 80201-8749

TELEPHONE (303) 295-8000
TELECOPIER (303) 295-8261
TWX 910-931-0568

CYNTHIA S. LEAP
(303) 295-8342

November 4, 1991

VIA TELECOPY

D. Scott Brown
c/o Suzanne J. Bohan, Esq.
Regional Counsel Office
U.S. Environmental Protection Agency
999 18th Street, Suite 700
Denver, CO 80202-2405

Dear Scott:

Enclosed are ambient levels at Asarco's East Helena plant from Jon Nickel, as you discussed last week. Please call me if you have any questions.

Very truly yours,

Cynthia S. Leap
for HOLLAND & HART

CSL/jp
Enclosure

cc: Jon C. Nickel

DRAFT

EAST HELENA TSP LEAD
SUMMARY RESULTS*
JANUARY 1990 - MARCH 1991
ug/m^3

QUARTER	FIREHALL	HADFIELD	DARTMAN	OLD RAILROAD	MANLOVE
1st 90	2.11	2.48	1.24	1.37	
2nd 90	2.54	2.01	1.29	1.18	
3rd 90	2.78	2.06	1.24	0.74	
4th 90	2.75	1.94	1.04	1.26	
1st 91	2.14	2.16	0.99	0.95	
2nd 91	2.05	1.14	0.48	1.08	

*Source information obtained from the Montana Department of Health and Environmental Sciences.

DRAFT

SUPER FUND HI-VOL SAMPLING DATA REPORT

(1) - INDICATES THAT THE STATE AQB IS PERFORMING THE FILTER ANALYISIS

N/R - INDICATES NO DATA AVAILABLE

SITE NAMES

DATE:	DAY OF WEEK	MANLOVE NOR/SOU	DARTMAN EAS/WES	OLDR&R EAS/WES	FIRHALL EAS/WES	HADF TSP EAST	HADF TSP WEST
08/02/91	FRI	0.14	1.20	0.60	1.84		
08/04/91	SUN	0.21	2.09	0.16	4.17	5.55	2.61
08/06/91	TUE	0.59	2.54	0.49	7.79		
08/08/91	THU	0.14	1.71	2.09	4.87		
08/10/91	SAT	0.22	2.01	1.96	3.67	N/R	2.21
08/12/91	MON	0.14	0.07	N/R	0.24		
08/14/91	WED	N/R	1.51	0.67	2.71		
08/16/91	FRI	0.21	(1)	0.18	3.33	4.10	3.64
08/18/91	SUN	0.07	1.41	0.28	4.43		
08/20/91	TUE	1.36	0.75	1.68	4.74		
08/22/91	THU	0.52	(1)	0.61	7.21	7.34	7.01
08/24/91	SAT	0.21	1.60	0.28	8.93		
08/26/91	MON	0.30	1.99	0.17	7.01		
08/28/91	WED	1.50	(1)	0.69	2.88	4.61	2.68
RADLEY SCHOOL CLEAN UP COMPLETED							
08/30/91	FRI	0.15	2.95	0.16	8.23		
09/01/91	SUN	0.43	0.55	0.16	2.06		
09/03/91	TUE	0.15	(1)	0.13	3.69	2.49	1.99
09/05/91	THU	0.24	2.07	0.08	4.76		
09/07/91	SAT	0.37	1.79	0.74	3.11		
09/09/91	MON	0.07	(1)	1.16	0.15	0.17	0.17
09/11/91	WED	0.15	1.55	0.25	2.18		
09/13/91	FRI	0.42	0.87	0.48	2.16		
09/15/91	SUN	0.53	(1)	0.17	1.28	0.95	1.02
09/17/91	TUE	0.07	0.07	0.91	0.13		
09/19/91	THU	0.14	1.94	0.21	5.96		
09/21/91	SAT	0.14	(1)	1.10	0.14		
09/23/91	MON	0.72	0.34				
09/25/91	WED						
09/27/91	FRI						
09/29/91	SUN						

DRAFT

EAST HELENA SUPERFUND SITE
RESIDENTIAL SOIL REMOVAL ACTION

OCCUPATIONAL EXPOSURE RESULTS
1991 CONSTRUCTION SEASON

L E A D

Employee Name	Job Classification	Date	#of Min.	CONC'N (mg/m3)
Nate Halubka	Equip.Operator	7/22	460	<.002
Jim Hartwell	Equip.Operator	7/23	462	.002
Michael Hamblin	Equip.Operator	7/24	480	.002
Jerome Friedsam	Grader Operator	7/25	500	.002
Mark Johnson	Truck Driver	7/26	370	<.003
Jim Hartnett	Laborer	8/01	485	.002
Jerome Freidsam	Equip.Operator	8/02	480	<.002
John Mitschke	Laborer	8/06	475	.004
Bob Wilson	Truck Driver	8/05	485	.004
Rob Holmes	Laborer	8/07	480	.002
William Boegli	Laborer	8/08	495	<.002
Fred Feller	Laborer	8/08	480	.007
Victor Portillo	Laborer	8/09	460	.002
John Hazen	Equip. Operator	8/09	450	<.002
Ken Roope	Laborer	8/12	480	.003
Michael Hamblin	Laborer	8/12	490	<.002
Fred Fuller	Laborer	8/13	480	.006
Jim Hartwell	Laborer	8/14	495	.003
Rod Arensmeyer	Laborer	8/15	465	.002
Rob Holmes	Laborer	8/15	480	<.005
Wes Rowe	Laborer	8/16	500	<.005
Jack Mitschke	Laborer	8/16	520	.002
Wayne Whitman	Cat Operator	8/23	480	.005
Val Bowen	Laborer	8/23	510	<.002
Fred Feller	Bobcat Operator	8/19	540	.002
Michael Hamblin	Bobcat Operator	8/19	525	.002
Ken Roope	Equip. Operator	8/20	440	<.002
Wes Rowe	Laborer	8/20	350	<.003
Rod Arensmeyer	Laborer	8/21	425	.007
Charlie Brown	Cleanup Crew	8/21	532	<.002
Rick Brown	Laborer	8/22	420	.003
Joe Flansaas	Cleanup Crew	8/22	570	<.002
Fred Fellar	Equip. Operator	8/26	555	.005
William Bolgli	Operator Cleanup	8/26	555	.002
Val Bowen	Laborer/Mechanic	8/27	480	<.002
Coug Green	Laborer	8/27	530	<.002
Jim Haitnett	Laborer	8/28	534	<.002
Joe Flansaas	Cleanup Crew	8/28	540	<.002
Michael Hamblin	Bobcat Operator	8/29	480	<.002
Deanna Hersey	Cleanup	8/29	500	<.002

DRAFT

EAST HELENA SUPERFUND SITE
RESIDENTIAL SOIL REMOVAL ACTION

OCCUPATIONAL EXPOSURE RESULTS
1991 CONSTRUCTION SEASON

L E A D

Employee Name	Job Classification	Date	#of Min.	CONC'N (mg/m3)
Rob Holmes	Laborer	8/30	495	<.002
John Mitschke	Laborer	8/30	510	.002
Doug Green	Cleanup	9/03	495	<.002
Ken Roope	Equip. Operator	9/03	495	<.002
Fred Feller		9/04	495	.004
William Boagle	Operator	9/04	495	<.002
Joe Flansaas	Cleanup	9/04	550	<.003
Rob Holmes	Laborer	9/06	425	<.004
Michael Hamlin	Equip. Operator	9/06	550	.004
Ken Roope	Operator	9/09	540	<.002
Jim Hartnett	Laborer	9/09	540	* .032
Deanna Hersey	Cleanup	9/09	540	<.002
Jack Mitschke	Laborer	9/09	512	.002
Michael Hamlin	Operator	9/13	530	.002
William Boegli	Operator	9/13	530	<.002
Robert Holmes	Laborer	9/16	580	<.002
Fred Feller	Operator	9/17	525	.002
Victor Portillo	Laborer	9/19	546	.002
Michael Hamlin	Operator	9/18	570	<.002
Jack Mitschke	Laborer	9/18	570	.002
Clint Vincent	Cleanup Crew	9/12	492	.004
Jim Hartnett	Laborer	9/20	545	.002
Rhonda Steffon	Cleanup	9/24	525	.003
William Boegli	Laborer	9/26	500	.002
Deanna Horsey	Cleanup	9/26	555	** .018
Jamie Lodge	Cleanup	9/30	575	.002
Ken Roope	Operator	9/30	560	<.002
Michael Hamlin	Operator	10/02	560	.002
Fred Feller	Operator	10/02	565	.005
Michael Hamlin	Operator	10/07	555	.003
Fred Feller	Operator	10/08	540	<.002
Ken Roope	Operator	10/09	540	<.002
Jack Mitschke	Laborer	10/10	560	.002
Victor Portillo	Laborer	10/11	560	.005

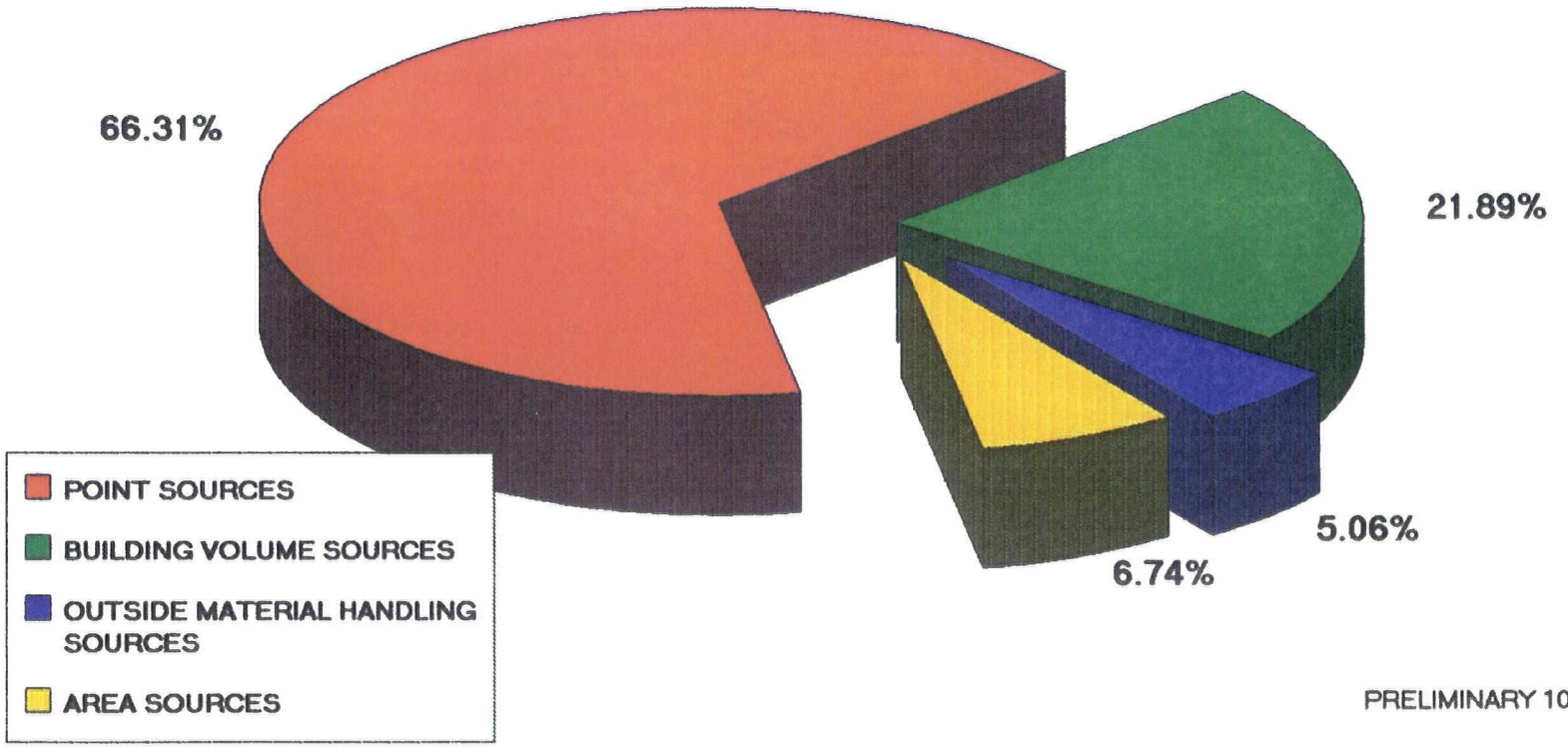
* Employee working in enclosed garage area removing dirt floor.
** Employee involved with wood chip removal at Main Street School.

EAST HELENA LEAD SIP
DENVER, CO
11/5/91

Name	AFFILIATION	Phone
Mindy Mohr	EPA R8	303-294-7539
John Coefield	Montana AQB	406-444-3454
Marlin Helming	EPA R8	303-293-0967
LARRY SVOBODA	EPA R8	303-293-0962 FTS-330-0962
BRUCE BANDORICK	EPA R8	303-293-0958
Doug Latimer	Latimer & Assoc.	303/642-7316
Dale Wells	EPA R8 TOB	303-293-0957
Gale F. Hoffnagle	TRC for ASARCO	203-289-8631
RICHARD MARCUS	ASARCO - SLC	801 262 2459
Paul D. Phillips	Holland & Hart Rep Asarco	303-295-8131
Robert A Little	ASARCO - East Helena	406-227-7120
TERRY O. COBLE	ASARCO - EAST HELENA	406-227-7160
LARRY COTTONE	NAWC	(801) 263-3500
Mike Ratcliff	CPP	(303) 221-3371
John A. Cooper	Keystone/NEA	(503) 624-2771
MARIUS GEDGAUDAS	EPA R8-APB	(303) 293-1763
DOUG SKIE	EPA 12 E	(303) 293-1752
Lee Hanley	EPA R8	(303) 293-1760
Laurie Ostrand	EPA - OAQPS	(919) 541-3277
Richard W. Daye	EPA VII ARTX	(913) 551-7619
Josh Tapp	" " "	(913) 551-7606
D. Scott Brown	EPA, Helena	406 449 5414
Suzanne Bohan	EPA, Regional Counsel	303-294-7531 FTS 330-7531
Elyana Sutin	EPA, Regional Counsel	303 · 294 · 1054
Catherine Collins	EPA, R8	(303) 293-1769
JON NICKEL	ASARCO - EAST HELENA	406-227-7100

ASARCO EMISSION CONTRIBUTIONS BY SOURCE TYPE

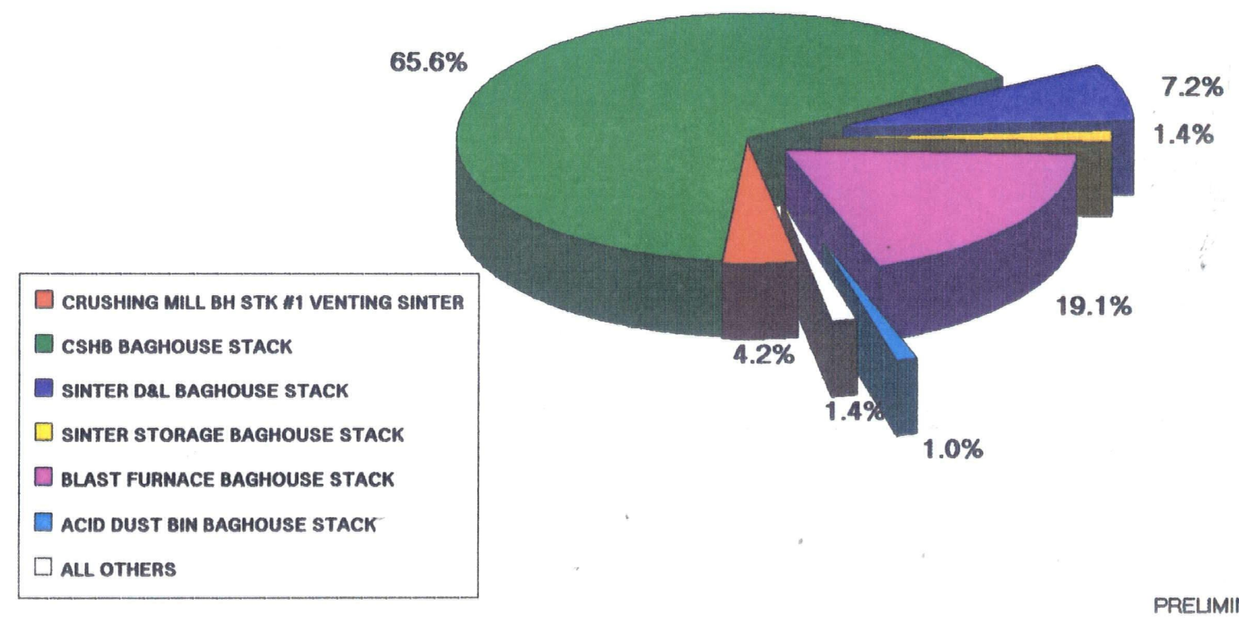
TOTAL EMISSIONS FROM ALL SOURCES = 219.5 LBS/DAY



PRELIMINARY 10/31/1991

ASARCO POINT SOURCE EMISSION CONTRIBUTIONS

TOTAL EMISSIONS FROM ALL SOURCES = 145.6 LBS/DAY



PRELIMINARY 10/31/1991

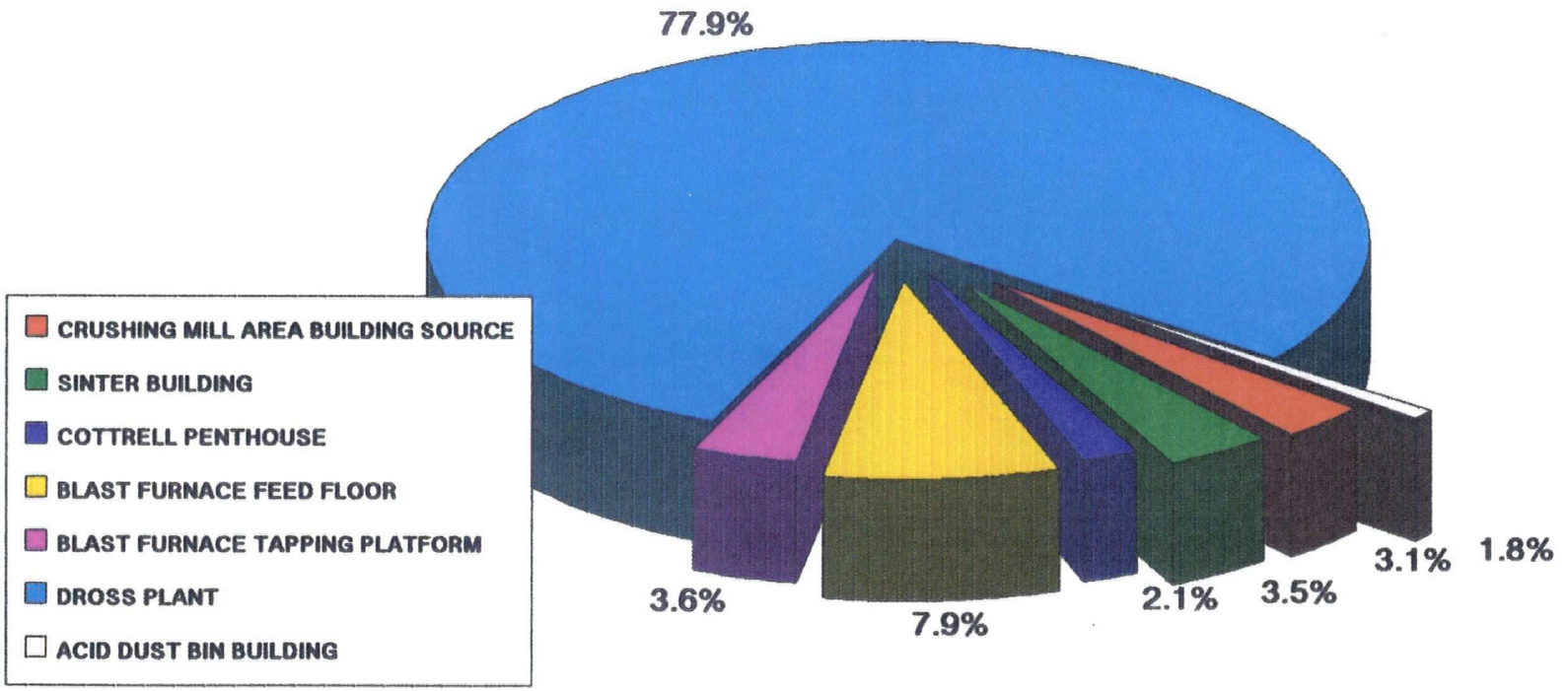
Stacks

The new ore storage bldg, it was discovered, was malfunctioning. Today, this is not the case, as the CSHB (concentrates storage and handling bldg.) baghouse has been fixed and is functioning well.

Sinter process stacks remain a signif. problem; also blast furnace baghouse stack

ASARCO BUILDING VOLUME SOURCE EMISSION CONTRIBUTIONS

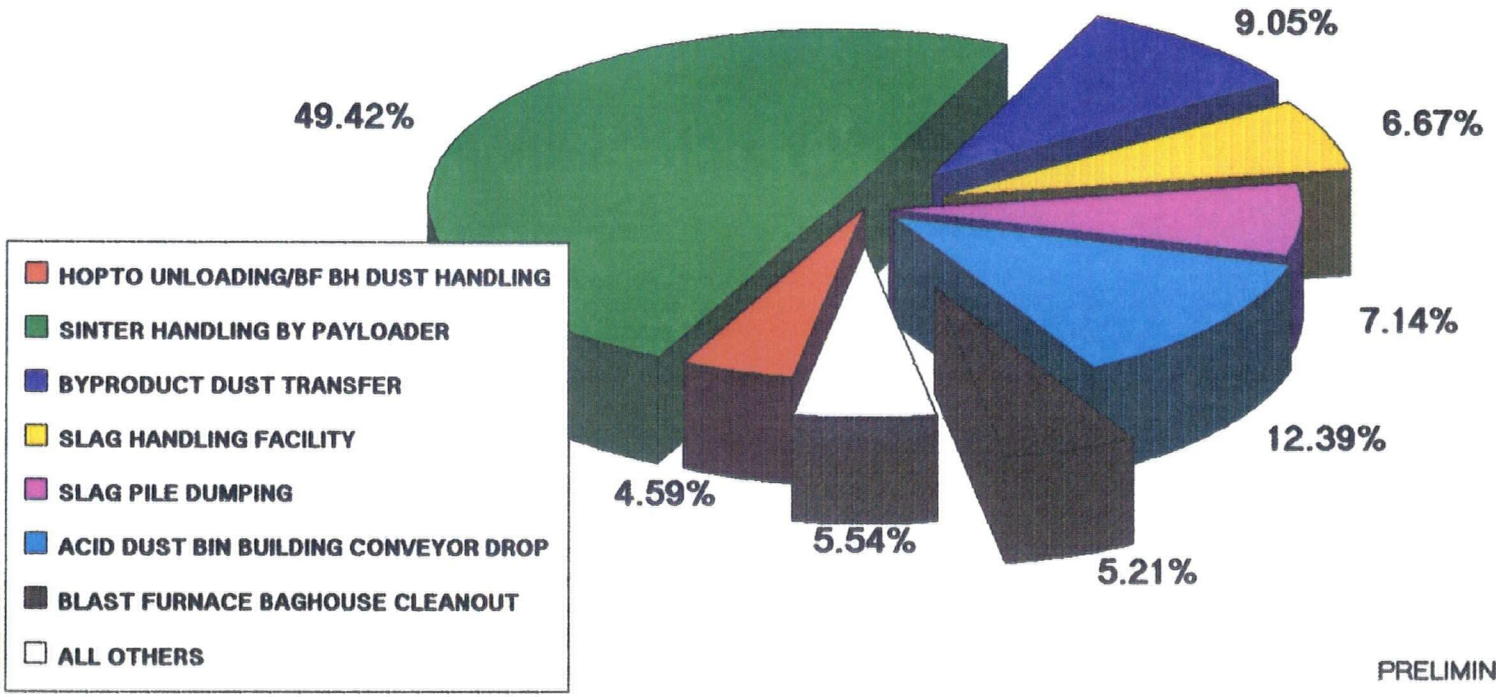
TOTAL EMISSIONS FROM ALL SOURCES = 48.1 LBS/DAY



PRELIMINARY 10/31/1991

ASARCO OUTSIDE MATERIAL HANDLING SOURCE EMISSION CONTRIBUTIONS

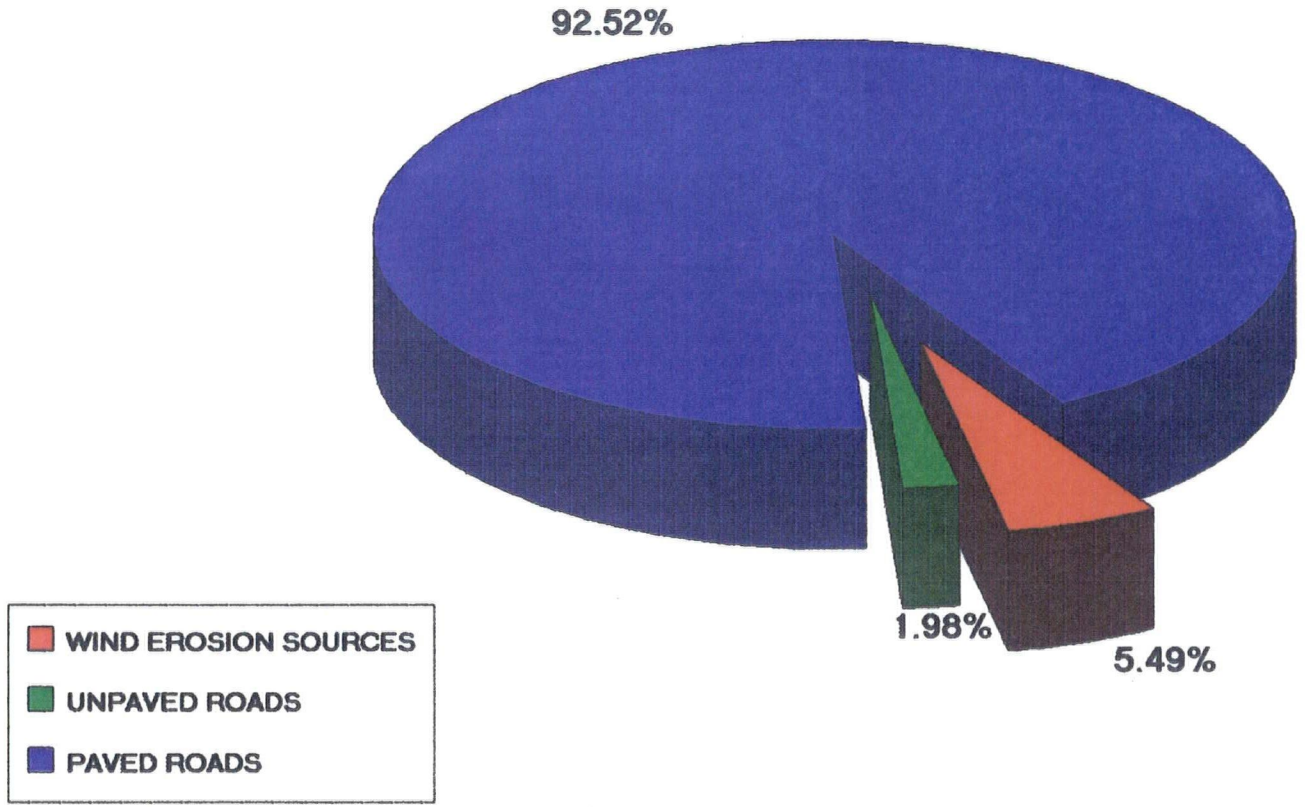
TOTAL EMISSIONS FROM ALL SOURCES = 11.1 LBS/DAY



PRELIMINARY 10/31/1991

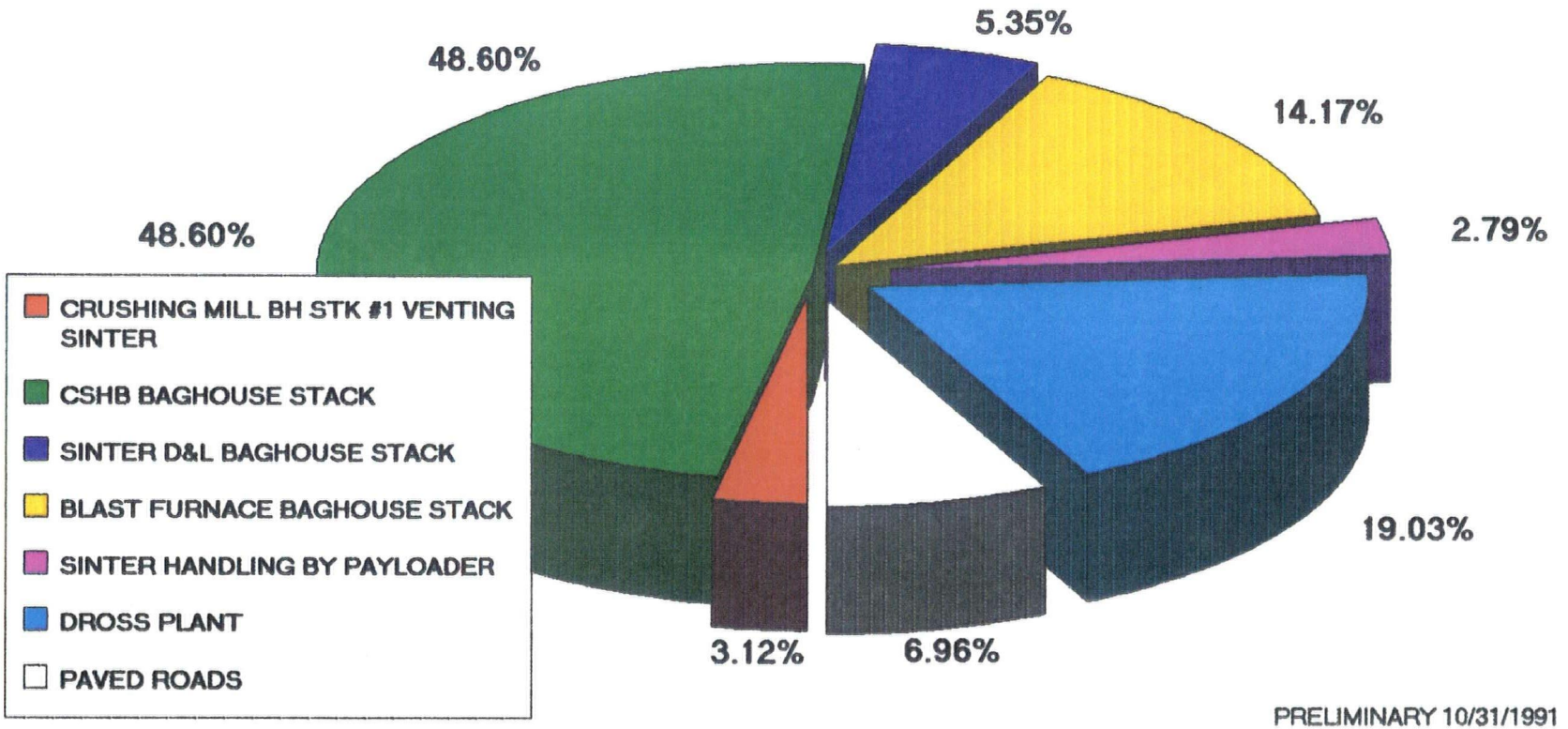
ASARCO AREA SOURCE EMISSION CONTRIBUTIONS

TOTAL EMISSIONS FROM ALL SOURCES = 14.8 LBS/DAY



PRELIMINARY 10/31/1991

ASARCO EMISSION CONTRIBUTIONS BY MAJOR SOURCES
(90% OF TOTAL EMISSIONS)



PRELIMINARY 10/31/1991

AQ Issues

EAST HELENA LEAD EMISSIONS SUMMARY
ACTUAL EMISSIONS JULY,1990-JUNE,1991

ASARCO SOURCES	40.170 TONS	(65.6%)
NON-ASARCO SOURCES	12.895 TONS	(34.4%)
TOTAL	53.065 TONS	(100 %)

ASARCO SOURCES

POINT SOURCES	26.567 TONS	(66.1%)
VOLUME SOURCES	10.903 TONS	(27.1%)
AREA SOURCES	2.700 TONS	(6.7%)
TOTAL	40.170 TONS	(100 %)

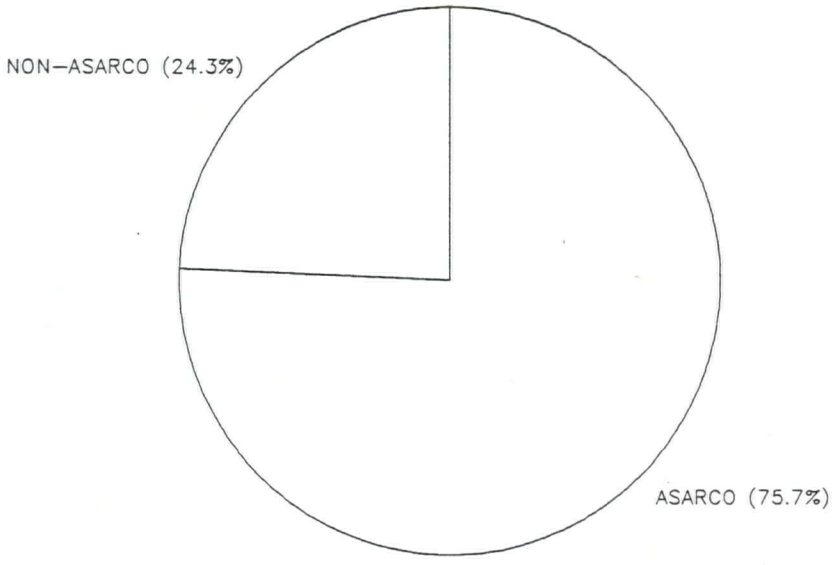
NON-ASARCO SOURCES

PAVED ROADS AND PARKING	12.562 TONS	(97.4%)
UN-PAVED ROADS AND PARKING	0.124 TONS	(1.0%)
TAILPIPE	0.210 TONS	(1.6%)
TOTAL	12.895 TONS	(100 %)

Am. Chemet's contrib. is so small it wouldn't create a line on this chart, according to John Coefield.

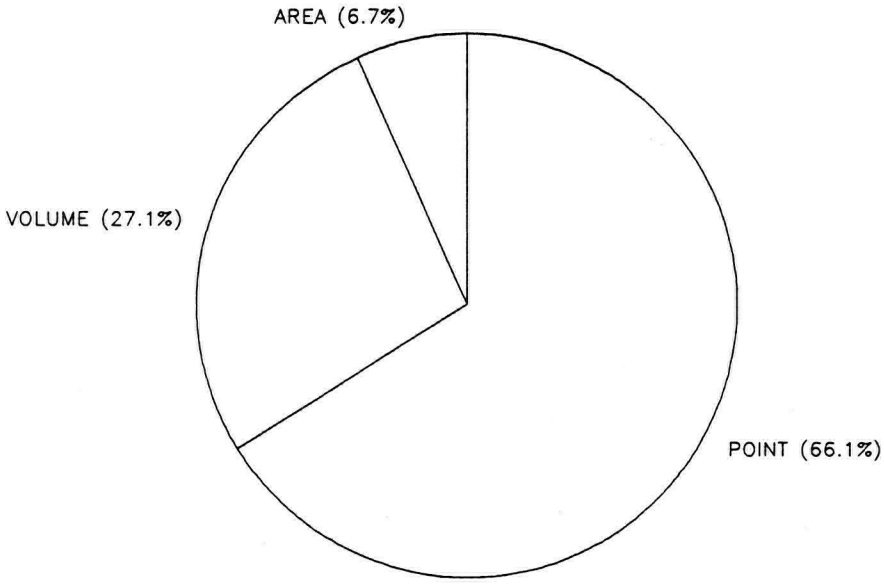
EAST HELENA LEAD SOURCES

ANNUAL EMISSIONS=65 TONS ? error



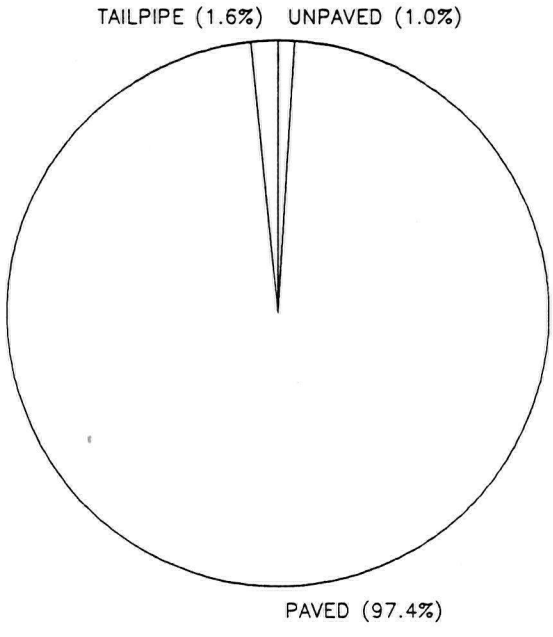
ASARCO LEAD SOURCES

ANNUAL EMISSIONS=40.170 TONS



NON–ASARCO LEAD SOURCES

ANNUAL EMISSIONS=12.895 TONS



Proposed Revised Schedule: 11/5/91

REVISED

TABLE 7 (cont.)

RESPONSIBILITIES AND SCHEDULING

5.	Submit Dispersion Modeling Protocol.	CPP, TRC	12/1/90
6.	Begin Everyday Lead/CMB Sampling.	ASARCO	7/1/89
7.	Evaluate, revise and conduct CMB modeling.	NEA, Inc.	3/1/90 - 4/1/91
8.	Complete a detailed lead emission inventory for July 1, 1990 to December 31, 1990.	SIP committee	3/1/91
9.	Conduct a dispersion model for the third and fourth quarters of 1990.	ASARCO	4/1/91
10.	Reconcile the dispersion model with the CMB modeling results and ambient monitoring data.	ASARCO and SIP Committee	9/1/91
11.	Update dispersion model to include first and second quarter 1991 data.		~~11/1/91~~ 6 weeks after EPA approval of model.
11A.	Design value. *		
12.	Select control strategies based on the reconciled modeling.	SIP Committee	~~12/1/91~~ 3 months after EPA approval of design value.
13.	Demonstrate the adequacy of the control strategies to achieve the standard based on the reconciled dispersion modeling.	SIP Committee	~~12/1/91~~
14.	Develop the draft SIP.	SIP Committee	~~1/1/91~~ + 1 month
15.	Conduct public hearing.	MDHES	~~3/1/92~~ + 2 months
16.	Submit the SIP to EPA.	MDHES	~~4/1/92~~ + 1 month
17.	Complete installation of control strategies.	ASARCO, American Chemet, City of East Helena and the Montana Dept. of Highways	As per SIP
18.	Evaluate the SIP.	MDHES	

* Develop maximum allowable emission inventory and conduct design value modeling.

R=94%

November 5, 1991

EAST HELENA LEAD SIP

REPORTS REQUIRING FINAL EPA APPROVAL BEFORE FURTHER PROGRESS CAN BE MADE

1. Revised Modeling Protocol: East Helena Lead SIP (submitted March 1991).

2. Asarco East Helena Primary Lead Smelter Emission Inventory Report (submitted April 1991).

3. East Helena CMB Source Apportionment Study: 1990 Third and Fourth Quarters (submitted April 1991).

4. East Helena Dispersion Modeling Report: 50 Days Modeling (April 15, 1991).

5. East Helena Dispersion Modeling Report: Complex Terrain Screening (April 29, 1991).

6. On-Site Meteorology at the Asarco Plant (submitted September 1991).*

7. Reconciliation and Verification of ISCST Dispersion Model Lead Apportionments for East Helena, MT (submitted September 14, 1991).*

* No formal EPA comments yet received on these reports; EPA comments have been received, and Asarco responses have been submitted, on all other reports.

METEOROLOGICAL DATA

Network Description and Data Compliance

Study Year Climatological Summary

Worst-Case Day Selection

Background Concentration

Presented by:
Gale F. Hoffnagle, CCM
Vice President and Technical Director

TRC

TRC Environmental Consultants, Inc.

NETWORK DESCRIPTION

PURPOSE:
Define microclimate at the smelter

- Downslope gravity flows
- Downwash conditions
- WS/WD variation with height

NETWORK DESIGN:
Five meteorological stations

- Old Railroad (10 m)
- Firehall (11 m)
- Kennedy Park (2, 10 m)
- Zinc Stack (10, 35, 103 m)
- Plant Yard (2, 11 m)

PERIOD OF MONITORING

- **November 1989 - Present**

- **Designated modeling period: July 1990 - June 1991**

DATA RECOVERY FOR MODELING PERIOD

ALL PARAMETERS:

• Old Railroad	99.9%
• Firehall	97.9%
• Kennedy Park	96.7%
• Zinc Stack	91.6%
• Plant Yard	86%*

* Plant yard began operation during Q3 1990

MODELING DATA FILES

Three levels of meteorological data sets prepared:

- 10 m — Kennedy Park data with Old Railroad substitution
- 35 m — Zinc Stack data file
- 103 m — Zinc Stack data file

STUDY YEAR CLIMATOLOGICAL SUMMARY

July 1990 - June 1991 vs. Climatology at Helena, MT

- **Warmer**
  - Ave. monthly temp. +2.2° F
  - Ave. daily max. temp. +2.5° F
  - Ave. daily min. temp. +1.9° F
  - Max. temp. $\geq$ 90° F 19 days vs. 18 days
  - Min. temp. $\leq$ 32° F 167 days vs. 183 days

- **Drier**
  - 12 month total inches H_2O -0.43" (-3.8%)
  - 12 month snow/ice -1.00" (-2.1%)
  - Q1, Q2, Q3 1.5" below normal (-22.3%)

- **Windier**
  - Ave. wind speed 8.2 mph vs. 7.8 mph
  - New peak gust records
    - July 1990 64 mph
    - Nov. 1990 61 mph

WORST-CASE DAY SELECTION

- **Obtain OR and FH highest daily lead concentration for each quarter (25 days for Q1 and Q2, 5 days for Q3 and Q4)**
- **Review ASARCO meteorological files for completeness (KP, OR, Zinc)**
- **Review availability of NWS data from Great Falls, MT**
  - Mixing height data - previous PM, AM, PM and next AM & PM
- **Propose list of days for modeling**

BACKGROUND CONCENTRATION

- **Microwave site designated as background**

- **Sample considered for background if:**

  - Mean wind direction at Zinc Site (103 m) was not within 313° - 43° for any one 24-hour period

  - At least 12 days were desired for quarterly calculation

CONCENTRATION CALCULATION

- Q3 0.03 ug/m^3 based on alternate procedure
- Q4 0.02 ug/m^3 based on proposed procedure
- Q1 0.02 ug/m^3 based on proposed procedure
- Q2 0.02 ug/m^3 based on mean of Q3, Q4 and Q1

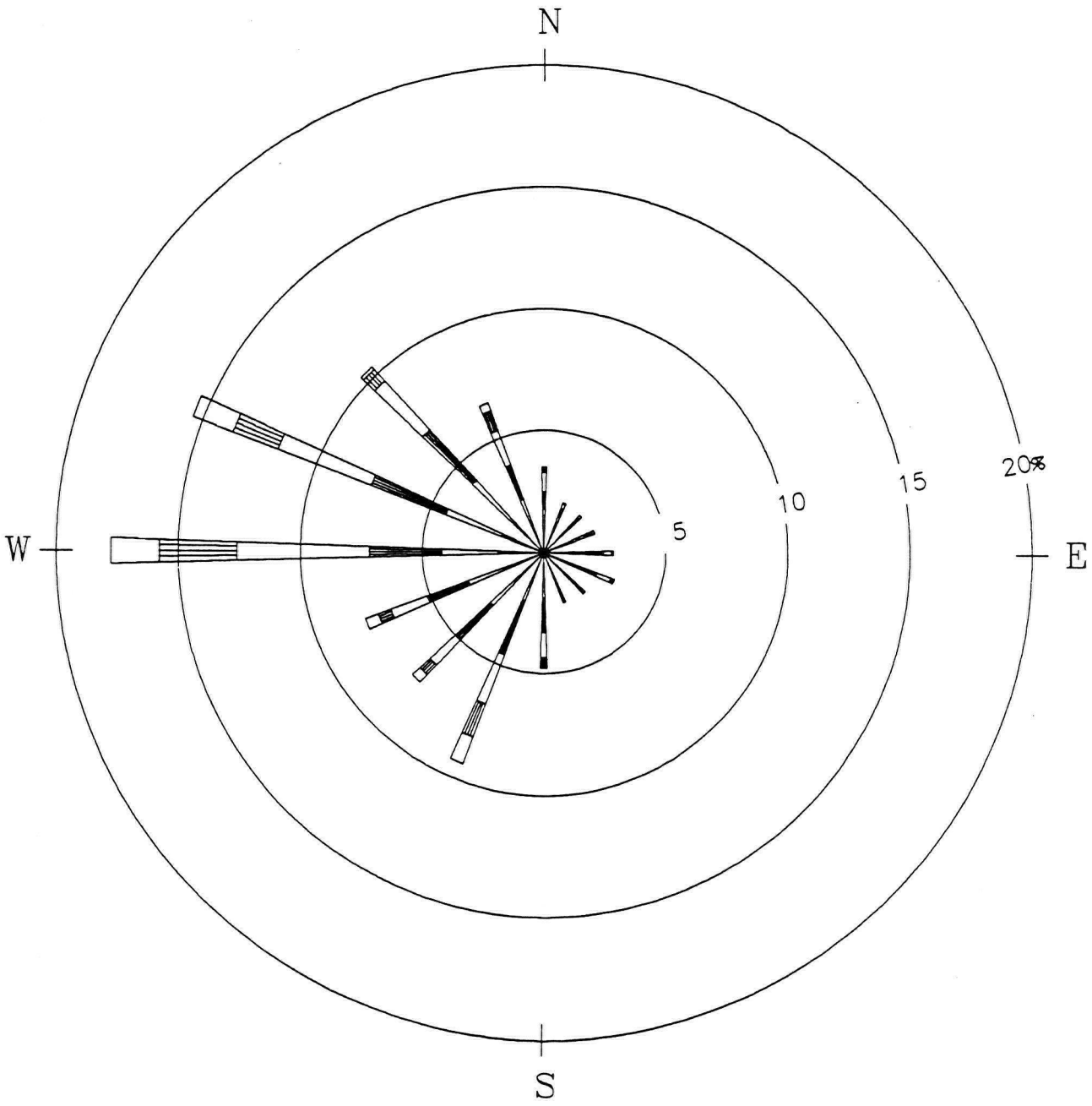
TABLE 3

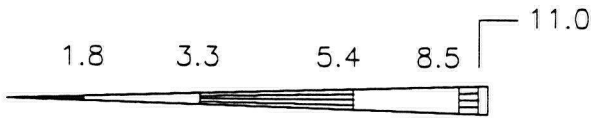
SUMMARY OF QUARTERLY DATA RECOVERY
(% OF POTENTIAL HOURS)

1990-1991

	1990 Quarters				1991 Quarters	
	1st	2nd	3rd	4th	1st	2nd
Kennedy Park (10 m)						
WS	98.3	99.6	99.8	89.1	100	100
WD (σ_θ)	98.3	94.6	89.1	89.1	100	94.1
Temperature	98.9	99.6	99.8	100	100	100
Old Railroad (10 m)						
WS	77.8	82.6	99.9	100	100	99.8
WD (σ_θ)	77.8	82.6	99.9	100	100	99.8
Temperature	77.8	82.6	99.9	100	100	99.8
Firehall (12 m)						
WS	99.3	93.7	91.8	100	100	100
WD (σ_θ)	99.9	93.7	91.8	100	100	100
Temperature	99.9	93.7	91.8	100	100	100
Zinc Stack						
Upper (103 m)						
WS	95.3	89.6	83.2	91.8	97.9	93.5
WD (σ_θ)	95.3	89.6	83.2	91.8	97.9	93.5
Temperature	95.3	89.6	83.2	91.8	97.9	93.5
Mid (35 m)						
WS	95.3	89.6	83.2	91.8	97.6	93.5
WD (σ_θ)	65.0	63.5	83.2	91.8	97.6	93.5
Temperature	95.3	89.6	83.2	91.8	97.9	93.5
Lower (10 m)						
Temperature	95.3	89.6	83.2	91.8	97.9	93.5
Plant Yard						
Upper (11 m)						
Temperature	NA	NA	45.1	100	99.9	99.5
Lower (2 m)						
Temperature	NA	NA	45.1	100	99.9	99.5

NA = data not available





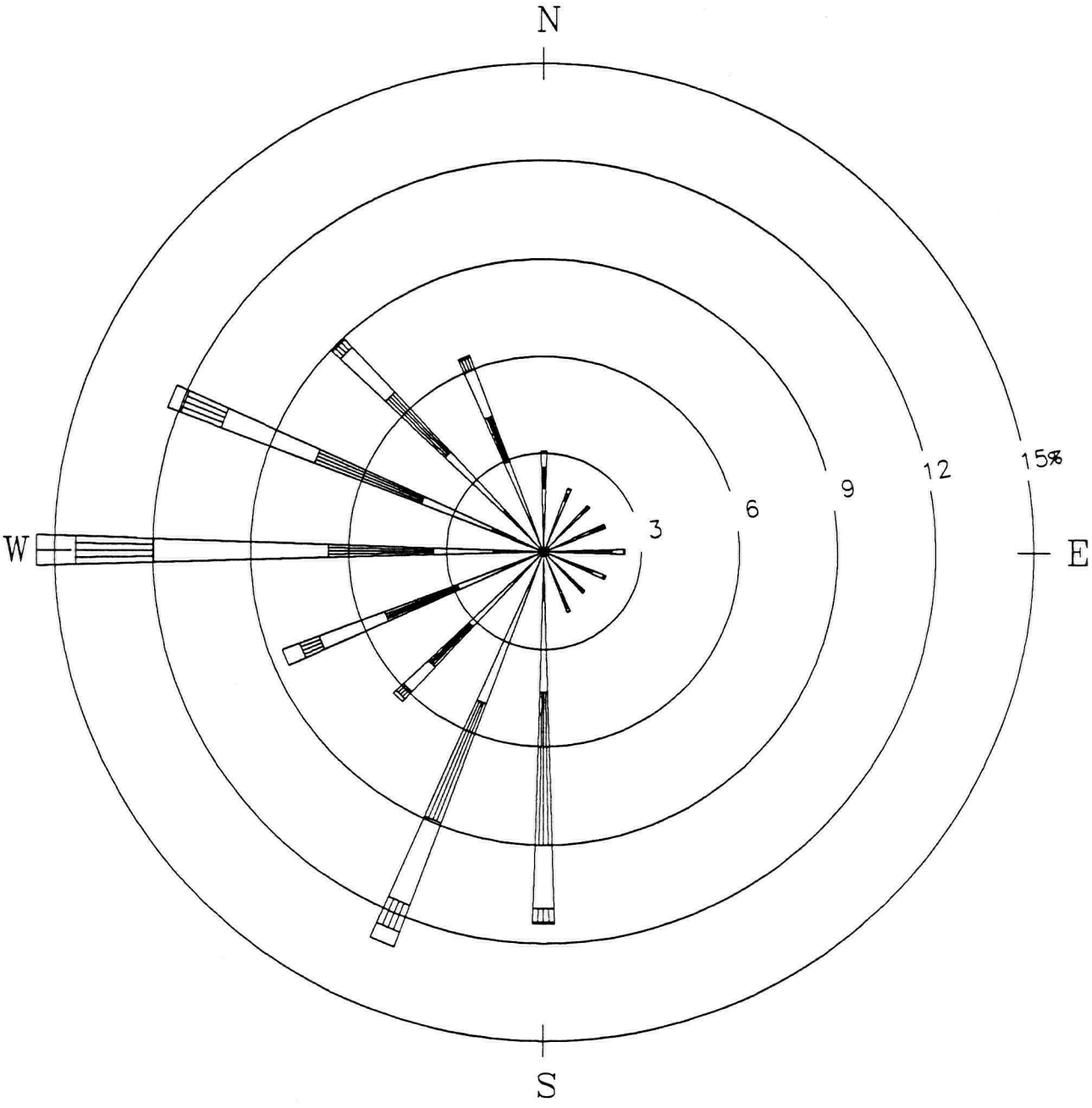
WIND SPEED CLASS BOUNDARIES
(METERS/SECOND)

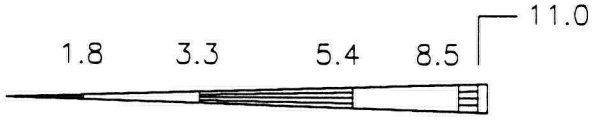
NOTES:
DIAGRAM OF THE FREQUENCY OF OCCURRENCE FOR EACH WIND DIRECTION. WIND DIRECTION IS THE DIRECTION FROM WHICH THE WIND IS BLOWING. EXAMPLE – WIND IS BLOWING FROM THE NORTH 3.5 PERCENT OF THE TIME.

WINDROSE

STATION NO. 0721
ASARCO 103m Data
PERIOD: 7/90–6/91

Bowman
Environmental
Engineering





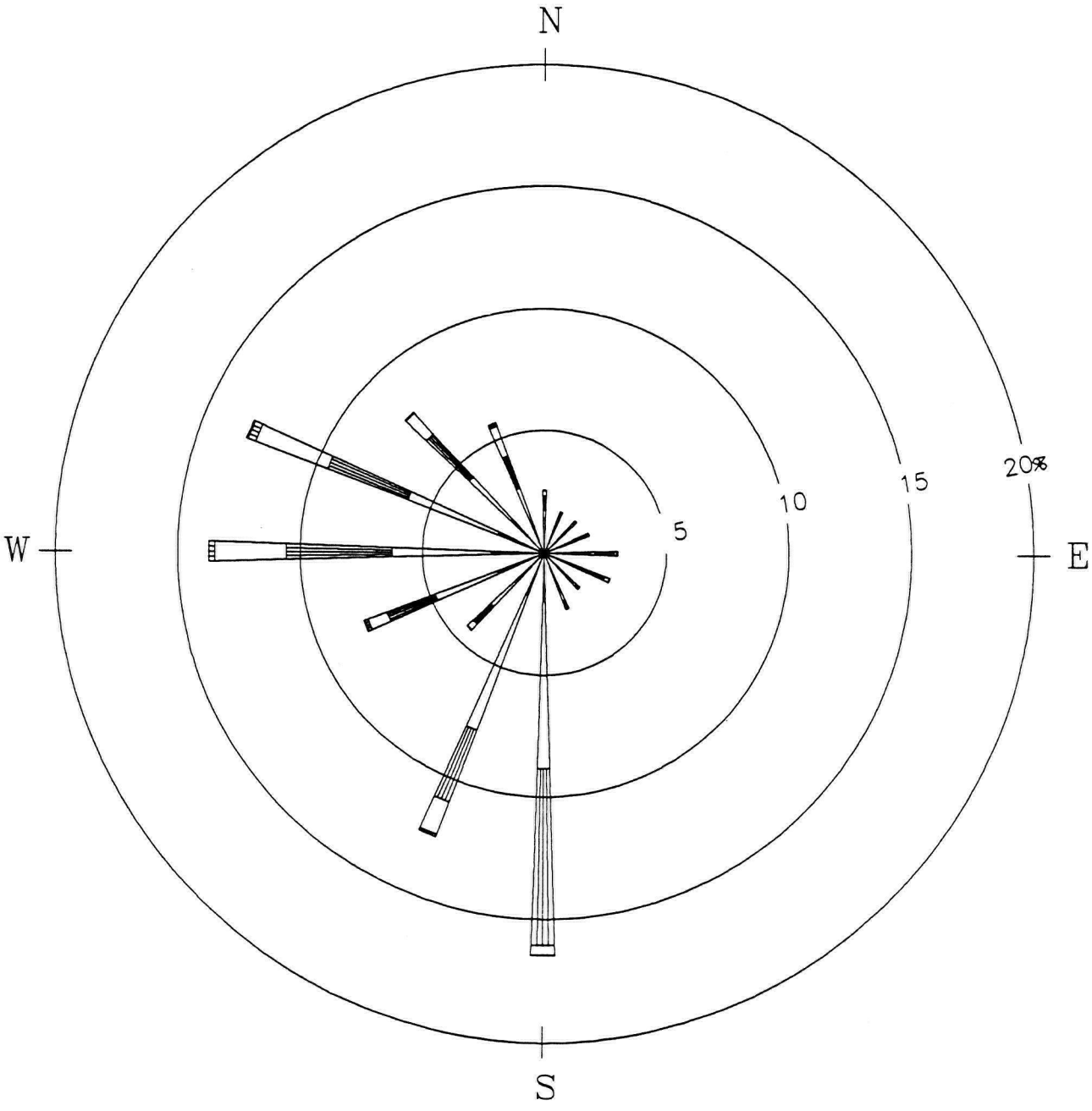
WIND SPEED CLASS BOUNDARIES
(METERS/SECOND)

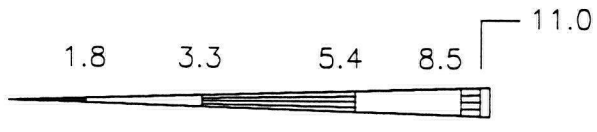
NOTES:
DIAGRAM OF THE FREQUENCY OF OCCURRENCE FOR EACH WIND DIRECTION. WIND DIRECTION IS THE DIRECTION FROM WHICH THE WIND IS BLOWING. EXAMPLE – WIND IS BLOWING FROM THE NORTH 3.1 PERCENT OF THE TIME.

WINDROSE

STATION NO. 0721
ASARCO 35m Data
PERIOD: 7/90–6/91

Bowman Environmental Engineering





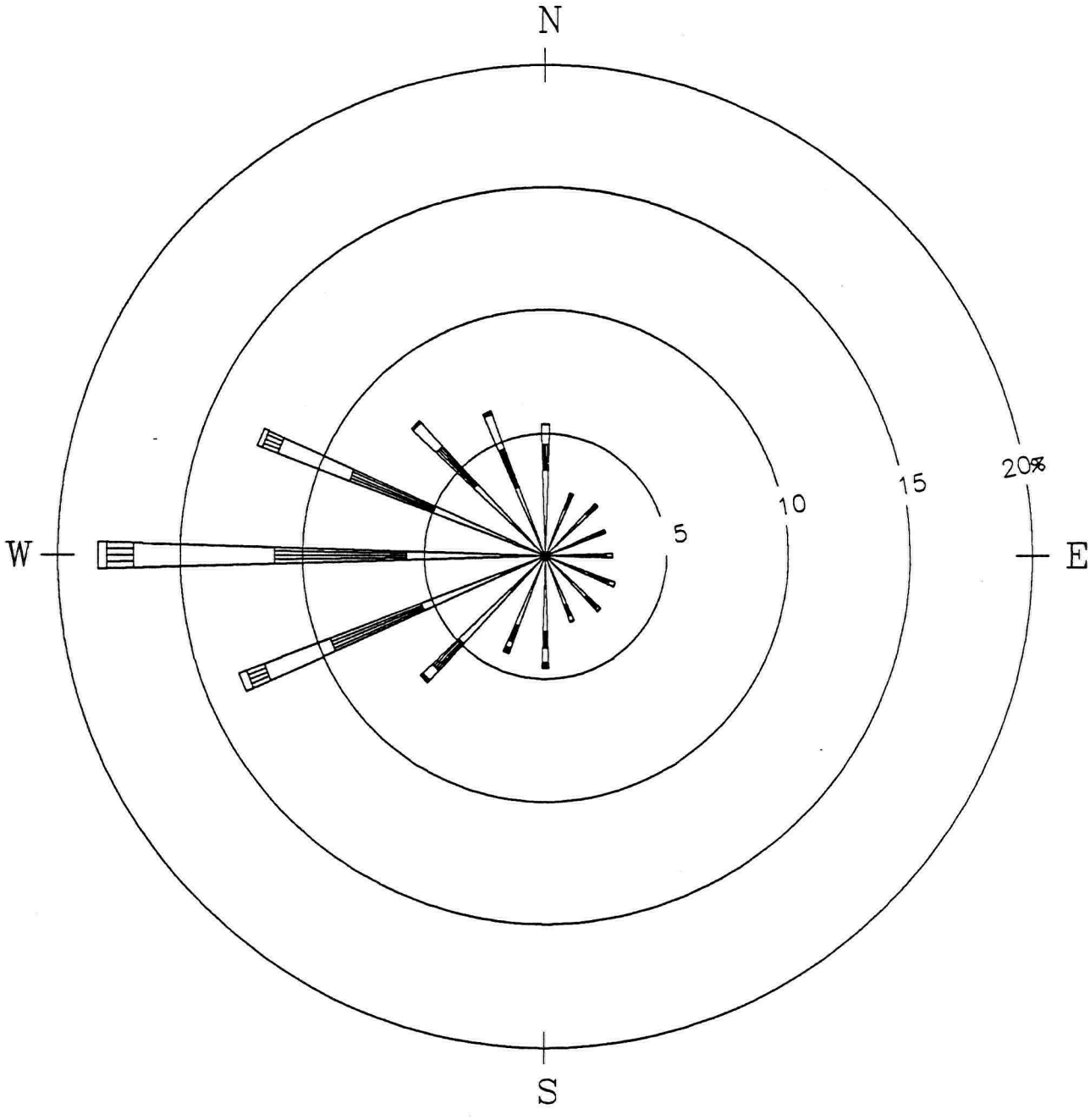
WIND SPEED CLASS BOUNDARIES
(METERS/SECOND)

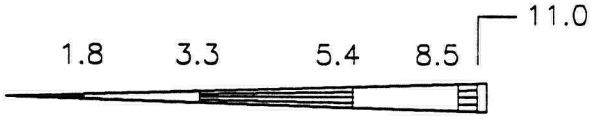
NOTES:
DIAGRAM OF THE FREQUENCY OF OCCURRENCE FOR EACH WIND DIRECTION. WIND DIRECTION IS THE DIRECTION FROM WHICH THE WIND IS BLOWING. EXAMPLE – WIND IS BLOWING FROM THE NORTH 2.5 PERCENT OF THE TIME.

WINDROSE

STATION NO. 0703
ASARCO 10m Data
PERIOD: 7/90–6/91

Bowman Environmental Engineering





WIND SPEED CLASS BOUNDARIES
(METERS/SECOND)

NOTES:
DIAGRAM OF THE FREQUENCY OF OCCURRENCE FOR EACH WIND DIRECTION. WIND DIRECTION IS THE DIRECTION FROM WHICH THE WIND IS BLOWING. EXAMPLE – WIND IS BLOWING FROM THE NORTH 5.4 PERCENT OF THE TIME.

WINDROSE

STATION NO. HLN
HELENA NWS
PERIOD: 1990

Bowman Environmental Engineering

TABLE 4.1

SOURCE CATEGORY GROUPINGS FOR MODEL RECONCILIATION

DESCRIPTION [a]	CMB Code #	DM Code #	Source Category Designation [b]
SOURCE CATEGORY #1			Sulfate Sources
ASC-Acid Plant Stack	2	8P	
Secondary Ammonium Sulfate	75		
SOURCE CATEGORY #2			High Ca Sources
ASH-Klinker Tower	6		
ASC-Environmental Office Rd,unpaved	16	1-2A18	
SOURCE CATEGORY #3			Sinter/Acid Dust Handling
ASC-Acid Dust Bin Baghouse Stack	13	17P	
ASC-Acid Plant Dust	33		
ASC-Sinter	43	1A34	
ASC-Acid Dust Bin Bldg.	53	17V	
ASC-Sinter Handling by Payloader		8Vf	
ASC-Acid Dust Bin Conveyor Drop		17Va	
SOURCE CATEGORY #4			East Helena Roads
ASC-Shew Ridge	22	1A29	
HEL-Gravel Road South of Smelter	23		
HEL-Paved Collecter Rd - Main St.	44		
HEL-Paved Arterial Rd - US 12	45		
HEL-Paved Local Rd - Marton St.	46		
HEL-Unpaved Rd. - South Montana	47		
HEL-Paved Parking Lot-Firehall	48		
HEL-RR Yard, N. of Chemet	49		
AMC-Unpaved Parking Lot	50		
HEL-Fallow Field S. of Smelter	67		
HEL-Firehall Road Dust Composite	87		
HEL-Old Railroad Road Dust Composite	88		
HEL-Unpaved Roads and Parking Lots		1S2,2S4	
HEL-Paved Roads and Parking Lots		2S3	
HEL-Agricultural Fields		1S3,2S2	
SOURCE CATEGORY #5			American Chemet Pyromet
AMC-Pyromet Baghouse Stack	5	20P	
SOURCE CATEGORY #6			Blast Furnace Building
ASC-Blast Furnace Feed Floor	52	9V	
ASC-Blast Furnace Charge Bldg.	55	8Vb	
ASC-Blast Furnace Tapping Platform	60	10V	
SOURCE CATEGORY #7			Sinter Plant Stack
ASC-Sinter Plant (D&L) Baghse Stack	4	7P	
SOURCE CATEGORY #8			Speiss Pit Stack
ASC-Speiss Pit Stack	7	15P,15V	
SOURCE CATEGORY #9			Crushing Mill Baghse (sint. vent.)
ASC-Crushing Mill Baghse Stk(#1, sin. bldg vent.)	8	3Pa,4Pa	
SOURCE CATEGORY #10			Sinter Storage Baghse Stack
ASC-Sinter Storage Baghse Stack	10	9P	
SOURCE CATEGORY #11			Sample Mill Baghse Stack
ASC-Sample Mill Baghouse Stack	11	1P	
SOURCE CATEGORY #12			Dross Plant and Bullion Building
ASC-Dross Plant and Bullion Bldg	12	19P	

[a] ASC = ASARCO source, AMC = American Chemet source, ASH = Ashgrove Cement source, HEL = East Helena source.

[b] Designation for that source category used in reconciliation tables.

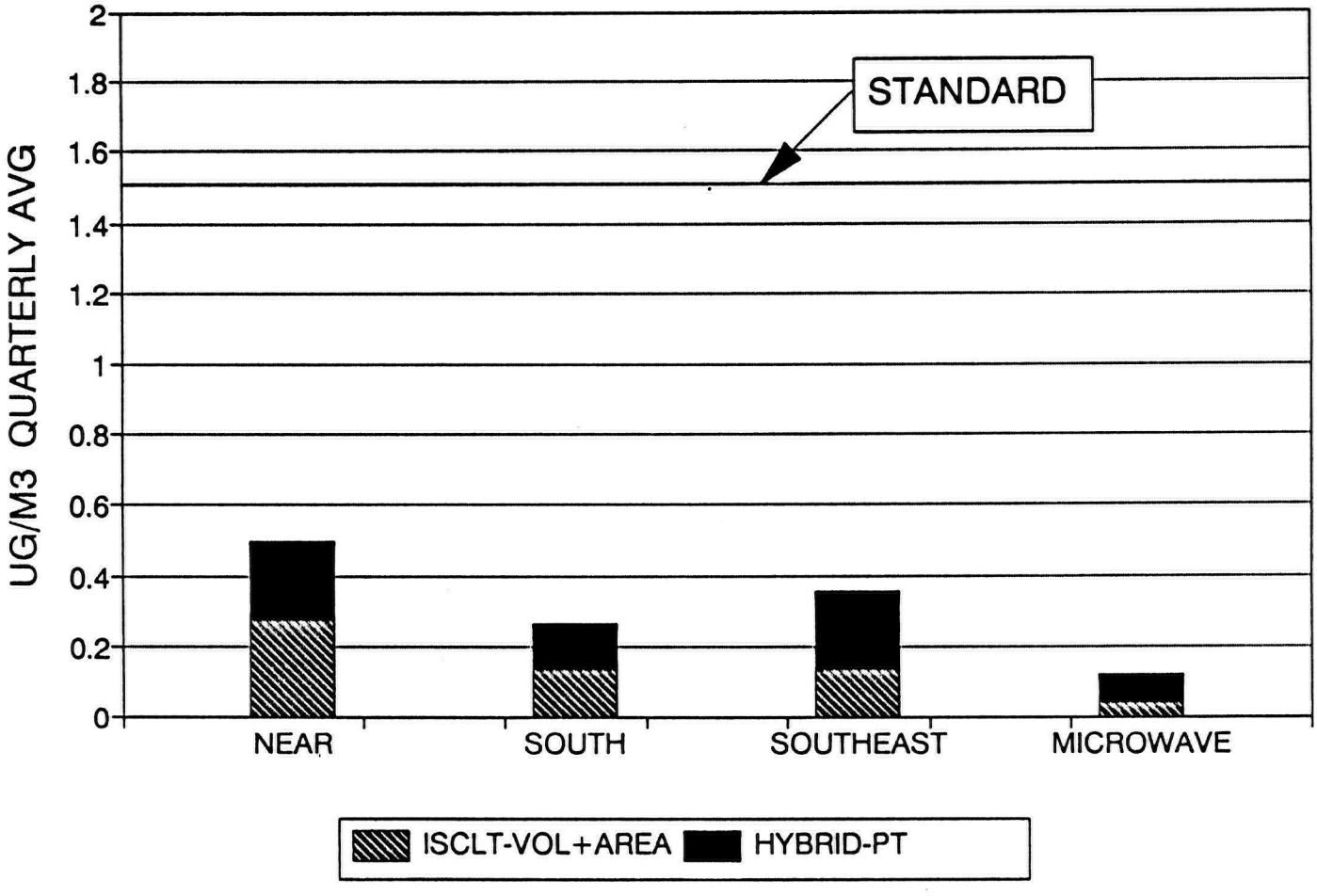
TABLE 4.1 (cont.)

DESCRIPTION [a]	CMB Code #	DM Code #	Source Category Designation [b]
SOURCE CATEGORY #13			Barren Ground E. of Smelter
HEL-Barren Ground East of Smelter	24	1S4	
SOURCE CATEGORY #14			Tetrahedrite Drier Baghouse
ASC-Tetrahedrite Drier Baghouse Stack	9	10P	
SOURCE CATEGORY #15			Slag Sources
ASC-Slag Pile Rd.,unpaved	15	1-2A26	
ASC-Slag Dust	83		
ASC-Slag Handling Facility		11V	
ASC-Slag Pile Dumping		12V	
ASC-Intersection to Slag Facility Rd		1-2A12	
ASC-Blast Furnace to Slag Facility Rd		1-2A21	
ASC-Back Slag Haul Rd		1-2A25	
ASC-Slag Pile		1A31	
SOURCE CATEGORY #16			Zinc Plant to Powerhouse Rd, paved
ASC-Zinc Plant to Powerhouse Rd,paved	27	1-2A19	
SOURCE CATEGORY #17			Tetrah. Drier to Intersect. Rd
ASC-Tetrah. Drier to Intersection Rd,unpaved	54	1-2A20	
SOURCE CATEGORY #18			CSHB Area Roads
ASC-Haul Truck Rd,paved	57	1-2A1	
ASC-CSHB Access to Platform Rd		1-2A4	
ASC-CSHB Access to Hopto Rd		1-2A5	
SOURCE CATEGORY #19			Motor Vehicle
Leaded Vehicle - Federal Test	72		
Heavy Duty Diesel - Federal Test	73		
Tailpipe Emissions		2S1	
SOURCE CATEGORY #20			CSHB Baghouse/Sinter Building
ASC-CSHB Baghouse Stack	80	6P	
ASC-Sinter Building Composite	81	6V	
SOURCE CATEGORY #21			Crushing Mill & Matte Handling
ASC-Crushing Mill Baghse Stk(mill vent.)	14	3P,4P,5P	
ASC-Lakeshore Access Loop Rd,unpaved	21	1-2A9	
ASC-CSHB Access Rd,paved	28	1-2A3	
ASC-E. Helena Matte	32		
ASC-Crushing Mill Bldg(primary matte crushing)	51	1V	
ASC-Crushing Mill Bldg(sec. matte crushing)	59	1V	
ASC-Precious Metals	62		
ASC-Crushing Mill Track Hopper		1Va	
ASC-Crushing Mill Conveyer Drop		1Vb	
ASC-Matte Handling by Payloader		8Vh	
ASC-Flue to Lakeshore Rd		1-2A8	
ASC-Flue to Intersection Rd		1-2A10	
SOURCE CATEGORY #22			Miscellaneous Sources
ASC-Blast Furnace Baghouse Stack	3	16P	
ASC-Blast Furnace to Machine Shop Rd,paved	17		
ASC-Slag Facility to Lab Rd,paved	18	1-2A13	
ASC-Entrance Rd East of CSHB,unpaved	19	1-2A2	
ASC-Dross Rd to CSHB,paved	20		
ASC-New Deal Rd,paved	26		
ASC-Acid Plant Rd,paved	29	1-2A17	
ASC-Tetrahedrites	30		
ASC-El Paso Dust	36		
ASC-Omaha Matte	37		
ASC-El Paso Calcines	38		

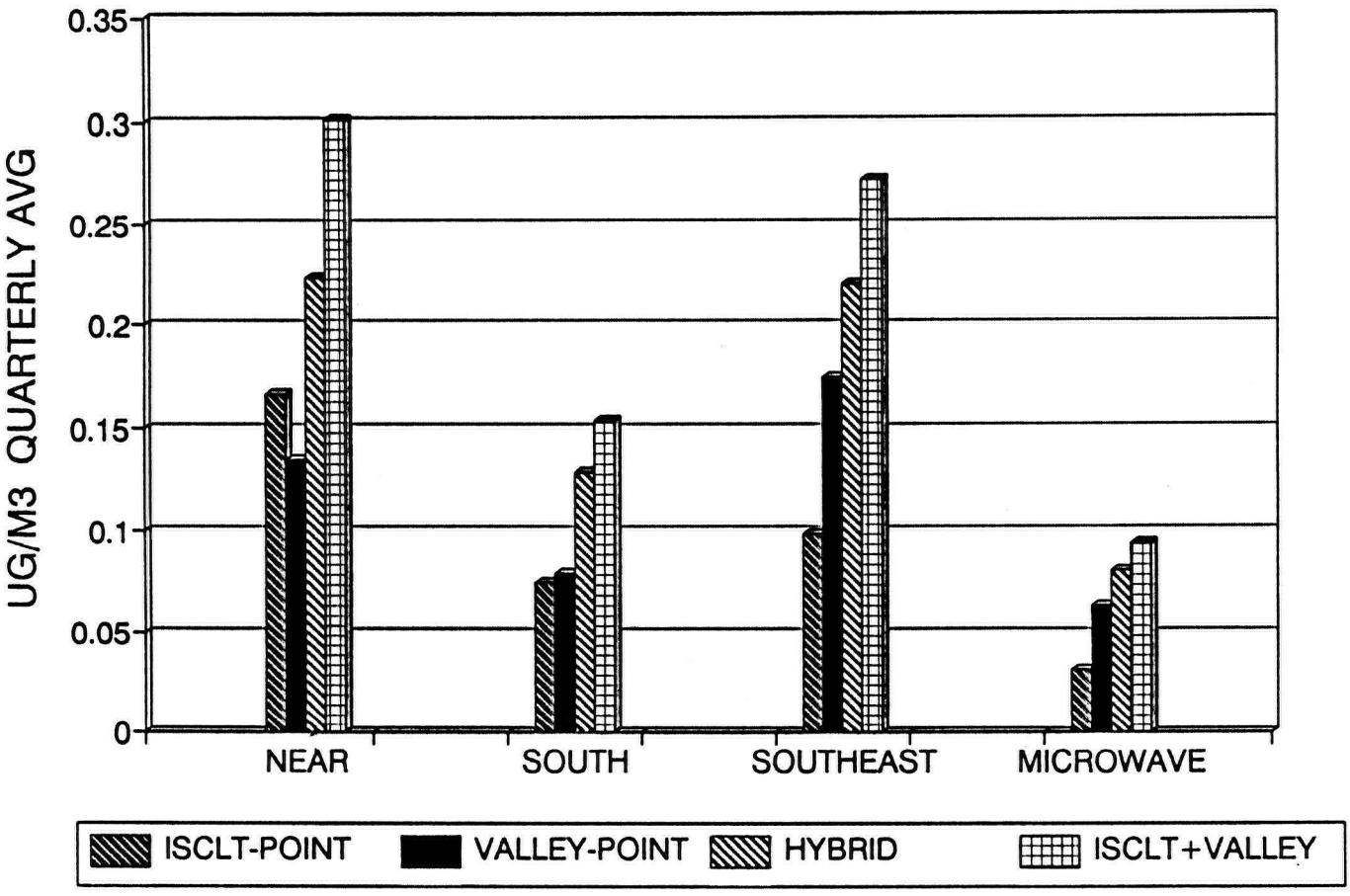
[a] ASC = ASARCO source, AMC = American Chemet source, ASH = Ashgrove Cement source, HEL = East Helena source.

[b] Designation for that source category used in reconciliation tables.

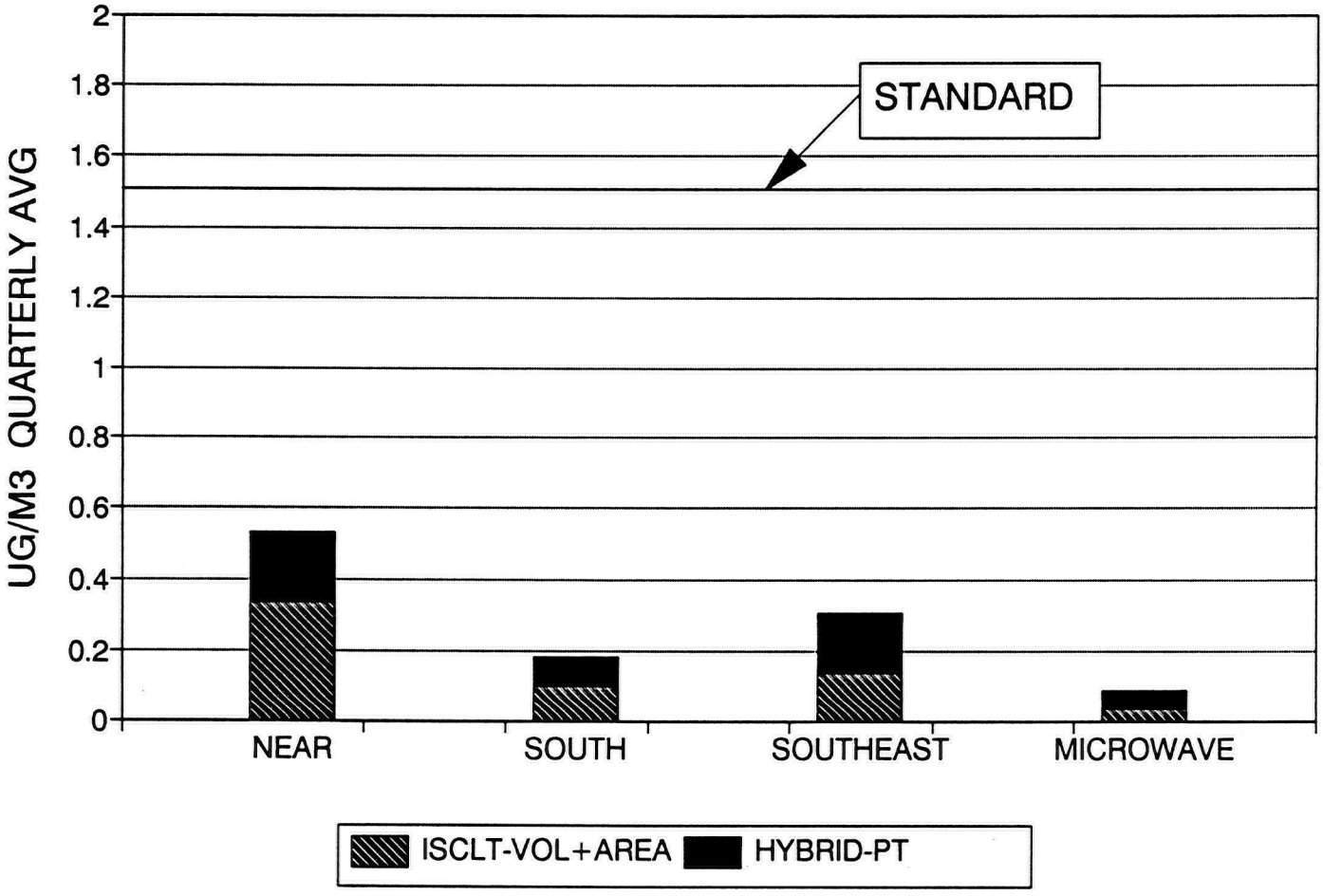
COMPLEX TERRAIN PREDICTIONS
3RD QUARTER



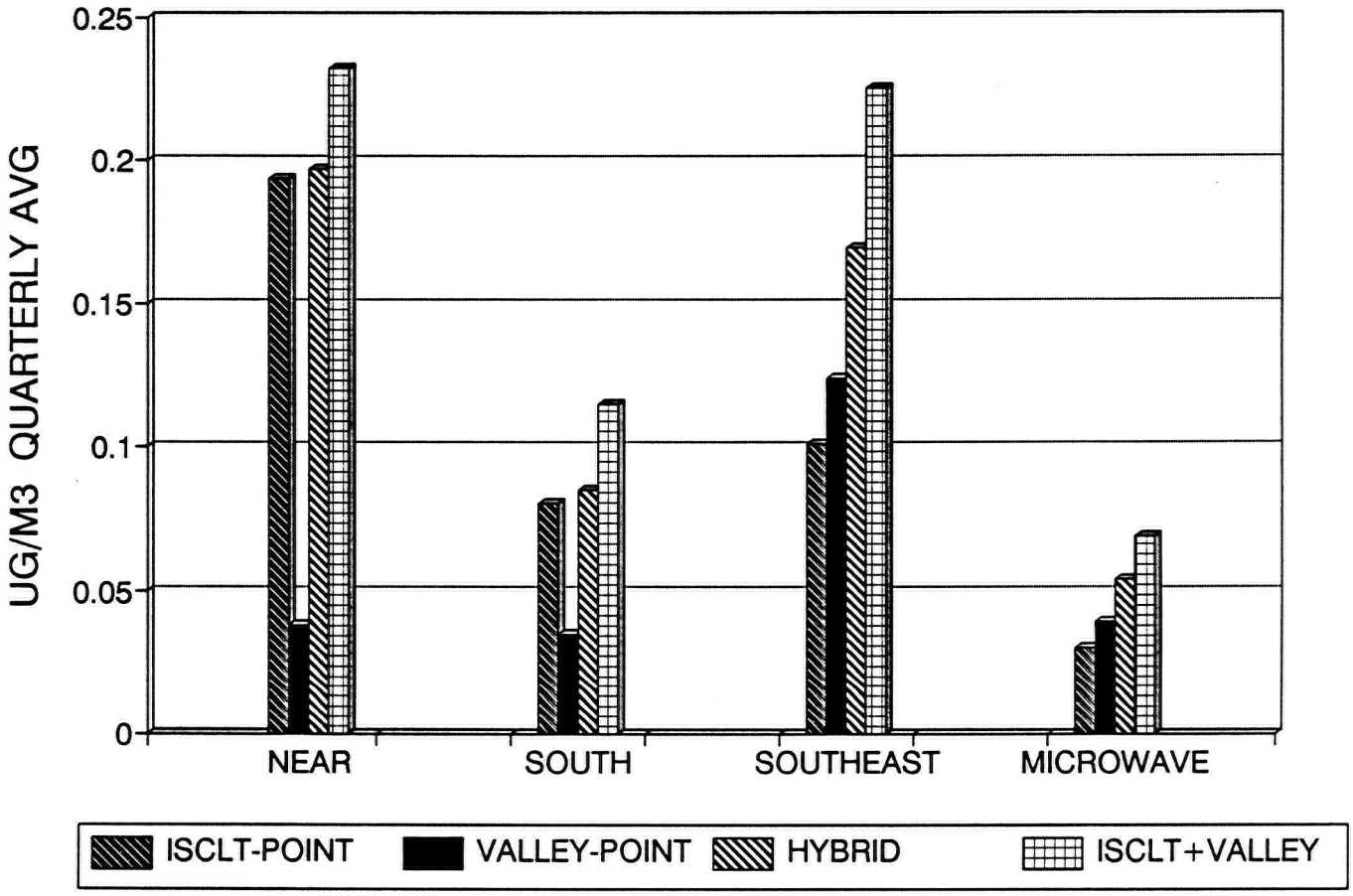
POINT SOURCE COMPLEX TERRAIN PREDICTION
3RD QUARTER



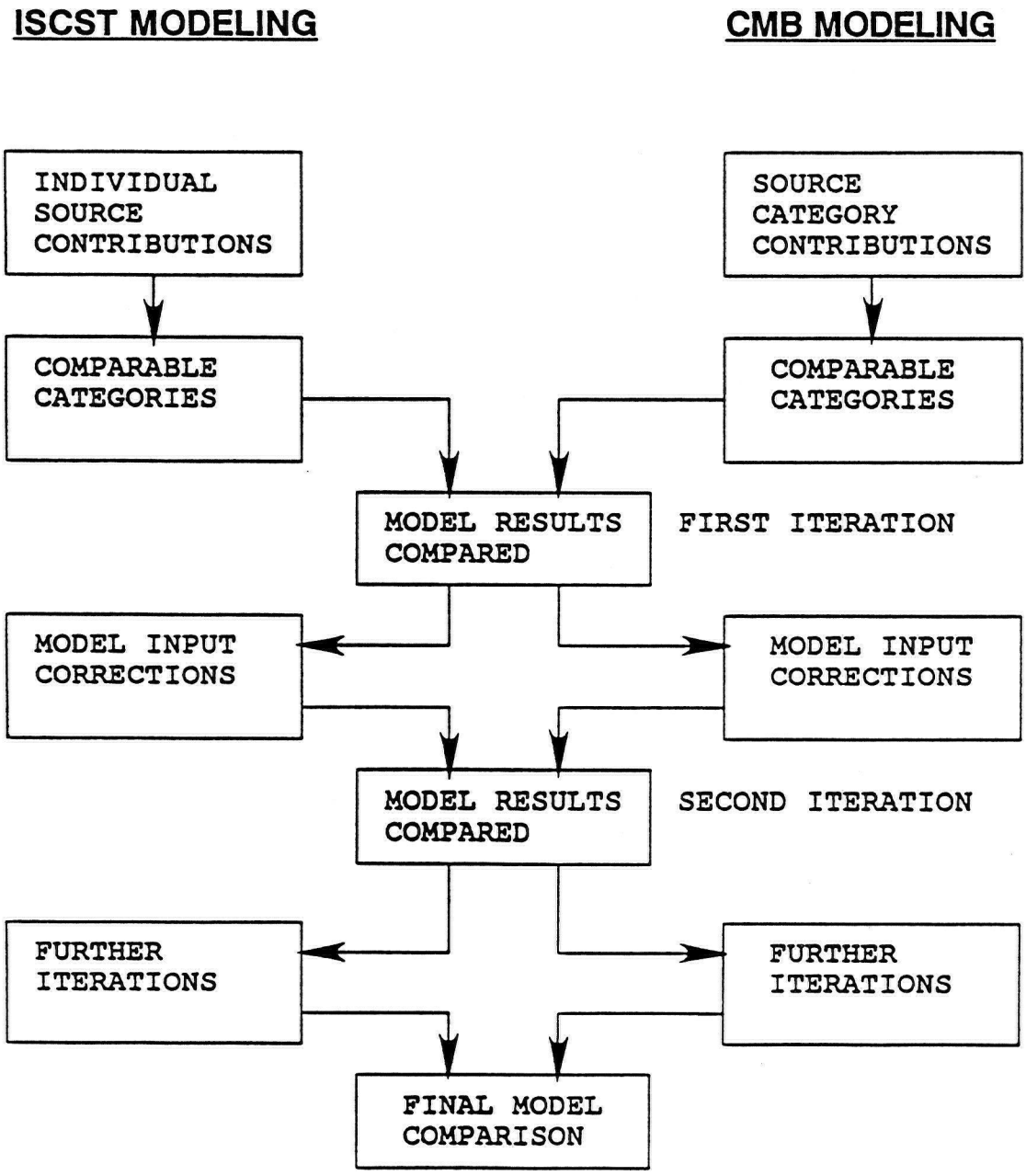
COMPLEX TERRAIN PREDICTIONS
4TH QUARTER



POINT SOURCE COMPLEX TERRAIN PREDICTION
4TH QUARTER



MODEL RECONCILIATION



EAST HELENA INTER-MODEL RECONCILIATION

Reconciliation Criterion:

- A source category is reconciled when the comparison intervals around the average source contribution estimates (%) from each model overlap. The averages are computed from all daily source contribution estimates in the study period.

(30% DM, 1 st. dev. RM)
disp. mod. / rec. model

Reconciliation Goal:

- For each source category, at least 84% of the daily comparison intervals around the source contribution estimates (%) from each model should overlap.

FIGURE 4.1

CMB vs. ISCST Model Comparison
Firehall Site – Major Source Categories

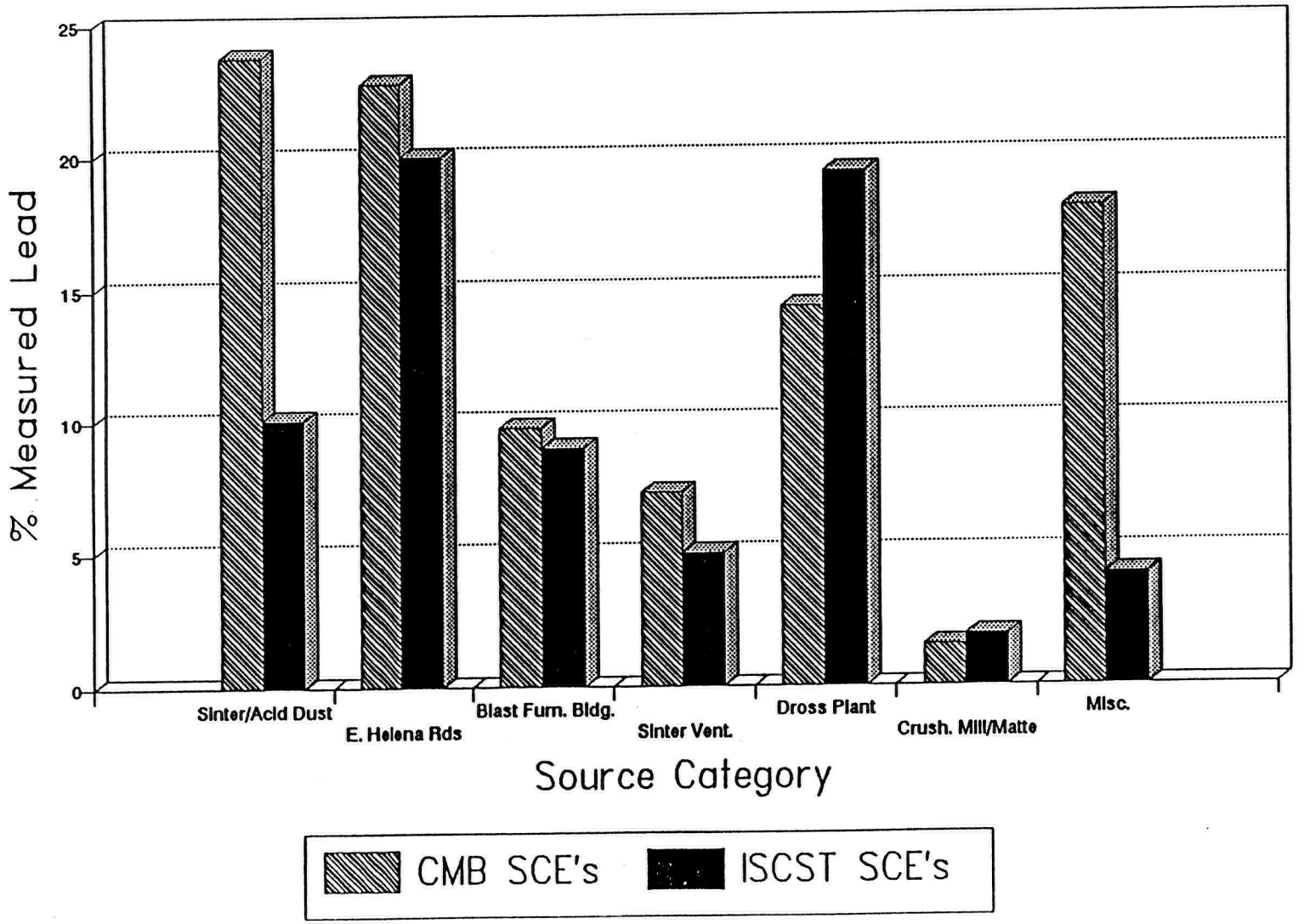
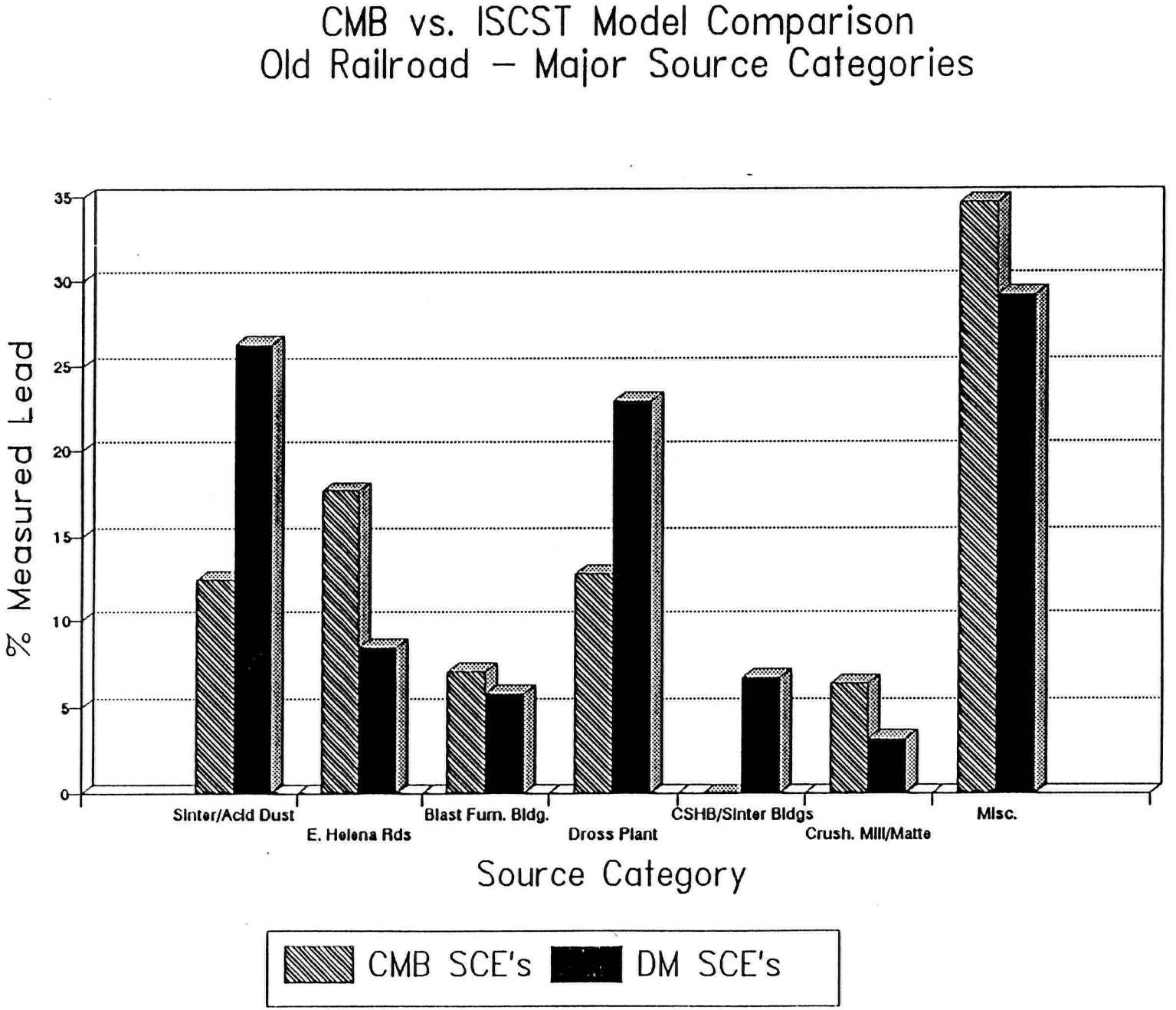


FIGURE 4.2


CMB vs. ISCST Model Comparison
Old Railroad – Major Source Categories
% Measured Lead
35
30
25
20
15
10
5
0
Sinter/Acid Dust
E. Helena Rds
Blast Furn. Bldg.
Dross Plant
CSHB/Sinter Bldgs
Crush. Mill/Matte
Misc.
Source Category
CMB SCE's
DM SCE's

Dispersion/Receptor Modeling Reconciliation

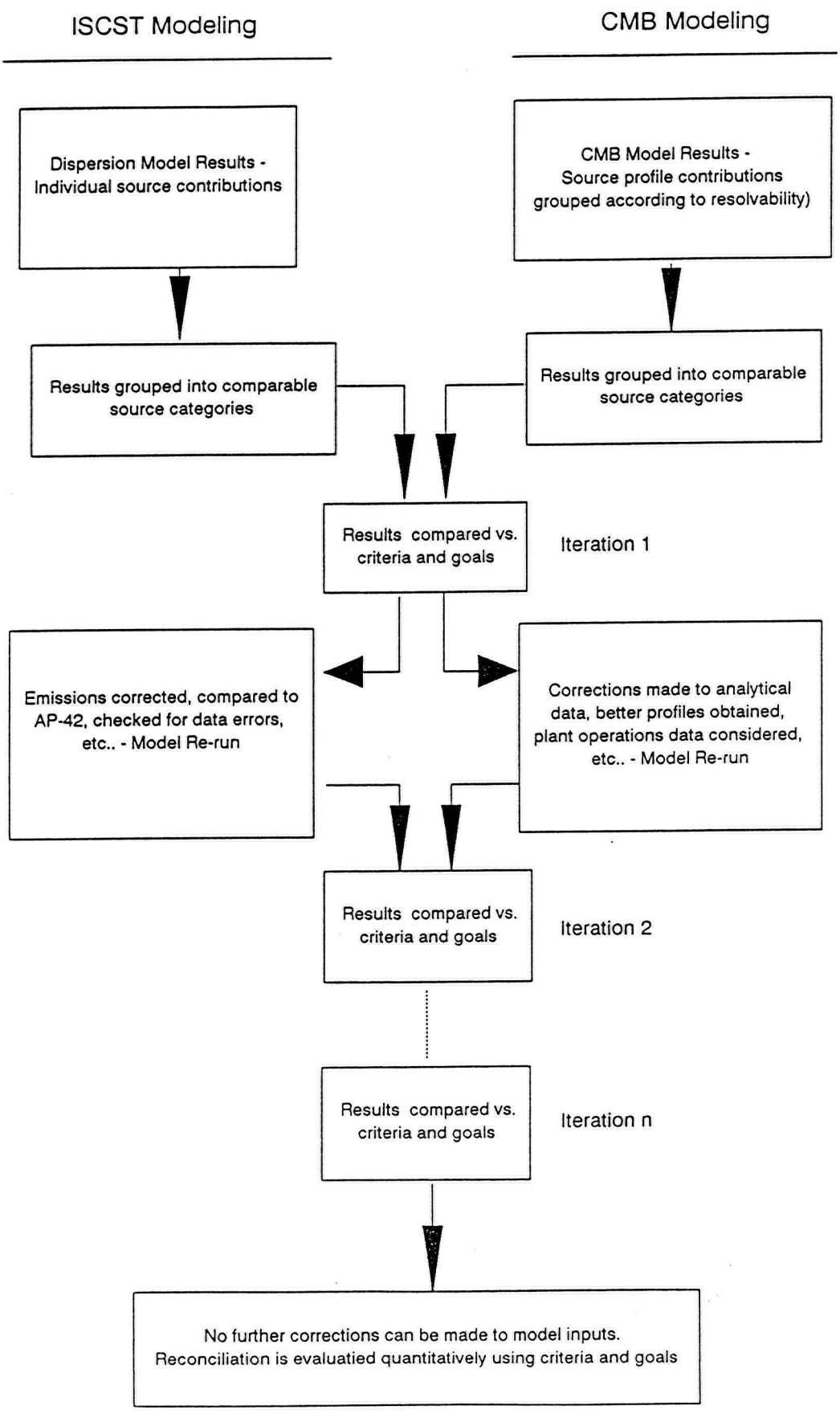


TABLE 4.1 (cont.)

DESCRIPTION [a]	CMB Code #	DM Code #	Source Category Designation [b]
SOURCE CATEGORY #22 (cont.)			
ASC-Globe Mix	40		
ASC-Plant Clean Up	41		
ASC-Amarillo Sharp Slag	42		
ASC-Breaking Floor Bldg	56		
ASC-Cottrell Penthouse	58	7V	
ASC-Belmont Crude	61		
ASC-Hopto to Flue Rd,paved	65	1-2A7	
ASC-Coke/Coke Breeze (Composite)	69		
ASC-Blast Furnace Baghouse Dust	79		
ASC-Tacoma Dust	82		
ASC-Wharves Copper Concentrate	84		
ASC-El Paso Converter Conditioning Chamber	85		
ASC-Hopto Unloading and Blst Furn Dust Handling		2V	
ASC-Old Ore Storage Yard		3V	
ASC-Breaking Floor Building		8Va	
ASC-Direct Smelt Bins		8Vi	
ASC-Transfer of Byproduct Dusts to 47 Feeder Bins		8Vk	
ASC-Transfer of Tetrahedrite Conc. to Hopper		16V	
ASC-Blast Furnace Baghouse Cleanout		18V	
ASC-Blast Furnace Flue Cleanout		19V	
ASC-South Entrance Rd to Flue		1-2A11	
ASC-Dross Rd to CSHB		1-2A14	
ASC-Charge Area Rd		1-2A15	
ASC-New Deal Rd		1-2A16	
ASC-Warehouse to Slag Facility Rd		1-2A24	
ASC-Old Ore Storage Yard Rd		1-2A28	
ASC-Old Ore Storage Yard		1A32	
SOURCE CATEGORY #23			Exclusive CMB Sources
ASH-Kiln Stack	1		
ASC-Paved Road-South Outside Storage	25		
AMC-Mills & Rotohearth Stack	70		
AMC-Zinox Stack	71		
Denver Woodsmoke Profile	74		
Secondary Ammonium Nitrate	76		
Secondary Organic Carbon	77		
Road Salt (NaCl)	78		
Sodium Carbonate (Na_2CO_3)	86		
SOURCE CATEGORY #24			Exclusive DM Sources
ASC-Laboratory Fire Assay Stacks		2P	
ASC-Dross Plant #1 and 3 Kettle Combust. Stacks		11P	
ASC-Dross Plant #2,4 and 5 Kettle Combust. Stacks		12P	
ASC-Dross Plant #6 Kettle Combust. Stacks		13P	
ASC-Dross Plant #7 Kettle Combust. Stacks		14P	
ASC-Zinc Furnace Baghouse Stack		18P	
ASC-High Grade Building Dumping Area		4V	
ASC-Zinc Plant Building		20V	
ASC-Zinc Baghouse Building		21V	
ASC-Hopto Area Rd		1-2A6	
ASC-Blast Furnace to Change House Rd		1-2A22	
ASC-Warehouse Rd		1-2A23	
ASC-Acid Plant Service Gate Road		1-2A27	
ASC-Parking Lot		1A30	
ASC-Paved Areas Between Buildings		1A35	

[a] ASC = ASARCO source, AMC = American Chemet source, ASH = Ashgrove Cement source, HEL = East Helena source.

[b] Designation for that source category used in reconciliation tables.

TABLE 4.5

Summary of Initial and Final Model Comparisons - Firehall Site

SC #	Description	Iter[a]	Avg. CMB SCE (%)[b]	Avg. ISCST SCE (%)[b]	Averages Overlap?	% Daily Overlap	Average PDC[c]
1	Sulfate Sources	I	0.00 ± 0.21	0.00 ± 0.00	Yes	100	0.0
		F	0.00 ± 0.21	0.00 ± 0.00	Yes	100	0.0
2	High Ca Sources	I	1.05 ± 5.39	0.03 ± 0.01	Yes	88	0.9
		F	0.00 ± 5.71	0.10 ± 0.00	Yes	100	0.0
3	Sinter/Acid Dust Handling	I	35.13 ±17.53	10.92 ± 3.28	No	40	25.8
		F	23.79 ±19.07	10.07 ± 3.02	Yes	48	21.1
4	East Helena Roads	I	8.43 ± 1.37	11.06 ± 3.32	Yes	48	5.2
		F	22.83 ± 5.94	20.00 ± 6.00	Yes	76	5.0
5	American Chemet Pyromet	I	2.36 ± 1.87	0.00 ± 0.00	No	20	2.1
		F	1.15 ± 3.02	0.00 ± 0.00	Yes	64	1.0
6	Blast Furnace Building	I	13.55 ± 7.55	3.89 ± 1.17	No	40	10.4
		F	9.78 ± 9.65	9.03 ± 2.71	Yes	68	9.1
7	Sinter Plant Stack	I	2.68 ± 7.40	0.01 ± 0.00	Yes	76	2.5
		F	0.00 ± 8.24	0.01 ± 0.00	Yes	100	0.0
8	Speiss Pit Stack	I	4.32 ± 2.01	0.31 ± 0.09	No	32	3.4
		F	0.14 ± 2.89	0.29 ± 0.09	Yes	96	0.4
9	Crushing Mill Baghse	I	0.00 ±13.10	5.55 ± 1.66	Yes	100	5.5
		F	7.25 ±13.72	5.01 ± 1.50	Yes	80	8.6
10	Sinter Storage Baghse Stack	I	0.32 ± 3.77	1.55 ± 0.46	Yes	96	1.8
		F	1.98 ± 3.38	1.57 ± 0.47	Yes	84	2.0
11	Sample Mill Baghse Stack	I	0.00 ± 0.21	0.03 ± 0.01	Yes	100	0.0
		F	0.00 ± 0.21	0.03 ± 0.01	Yes	100	0.0
12	Dross Plant and Bullion Bldg	I	6.73 ±10.26	31.10 ± 9.33	No	36	25.7
		F	14.30 ± 7.99	19.36 ± 5.81	Yes	24	19.1
13	Barren Ground E. of Smelter	I	0.00 ± 0.21	0.22 ± 0.07	Yes	96	0.2
		F	0.00 ± 0.21	0.00 ± 0.00	Yes	100	0.0
14	Tetrahedrite Drier Baghouse	I	0.00 ± 0.21	0.00 ± 0.00	Yes	100	0.0
		F	0.00 ± 0.21	0.00 ± 0.00	Yes	100	0.0
15	Slag Sources	I	0.00 ± 1.12	3.18 ± 0.95	No	56	3.2
		F	1.40 ± 0.76	1.92 ± 0.58	Yes	40	1.8
16	Zinc Plant to Powerhouse Rd	I	0.00 ± 0.21	0.00 ± 0.00	Yes	100	0.0
		F	0.00 ± 0.21	0.00 ± 0.00	Yes	100	0.0
17	Tetrah. Drier to Intersect. Rd	I	0.00 ± 0.21	0.00 ± 0.00	Yes	100	0.0
		F	0.00 ± 0.21	0.00 ± 0.00	Yes	100	0.0
18	CSHB Area Roads	I	0.00 ± 0.21	0.04 ± 0.01	Yes	100	0.0
		F	0.00 ± 0.21	0.02 ± 0.01	Yes	100	0.0
19	Motor Vehicle	I	0.00 ± 1.12	0.15 ± 0.04	Yes	100	0.1
		F	0.00 ± 1.12	0.27 ± 0.08	Yes	100	0.3
20	CSHB Baghouse/Sinter Building	I	0.00 ±14.37	1.36 ± 0.41	Yes	100	1.4
		F	1.48 ±14.01	1.22 ± 0.36	Yes	96	1.9
21	Crushing Mill & Matte Handling	I	2.02 ± 7.04	0.44 ± 0.13	Yes	92	2.1
		F	1.49 ± 6.36	1.86 ± 0.56	Yes	92	1.2
22	Miscellaneous Sources	I	18.19 ± 3.92	2.46 ± 0.74	No	20	13.7
		F	17.98 ± 9.35	4.20 ± 1.26	No	40	14.4
23	Exclusive CMB Sources	I	3.75 ± 0.87	na			
		F	0.15 ± 0.10	na			
24	Exclusive DM Sources	I	na	1.44 ± 0.43			
		F	na	1.09 ± 0.33			

[a] I - Initial model results (CPP, 1991; Keystone/NEA, 1991a)
F - Final model results (this report)

[b] Model apportionments in terms of percent of measured ambient lead (CMB) and percent of compliance lead (DM) apportioned in each model.

[c] Average absolute value of the daily PDCs (PDC = Percent difference relative to compliance lead concentration = [(ISCST - CMB)/Compliance lead]*100%) when SCEs are in $\mu g/m^3$.

TABLE 4.6

Summary of Initial and Final Model Comparisons - Old Railroad Site

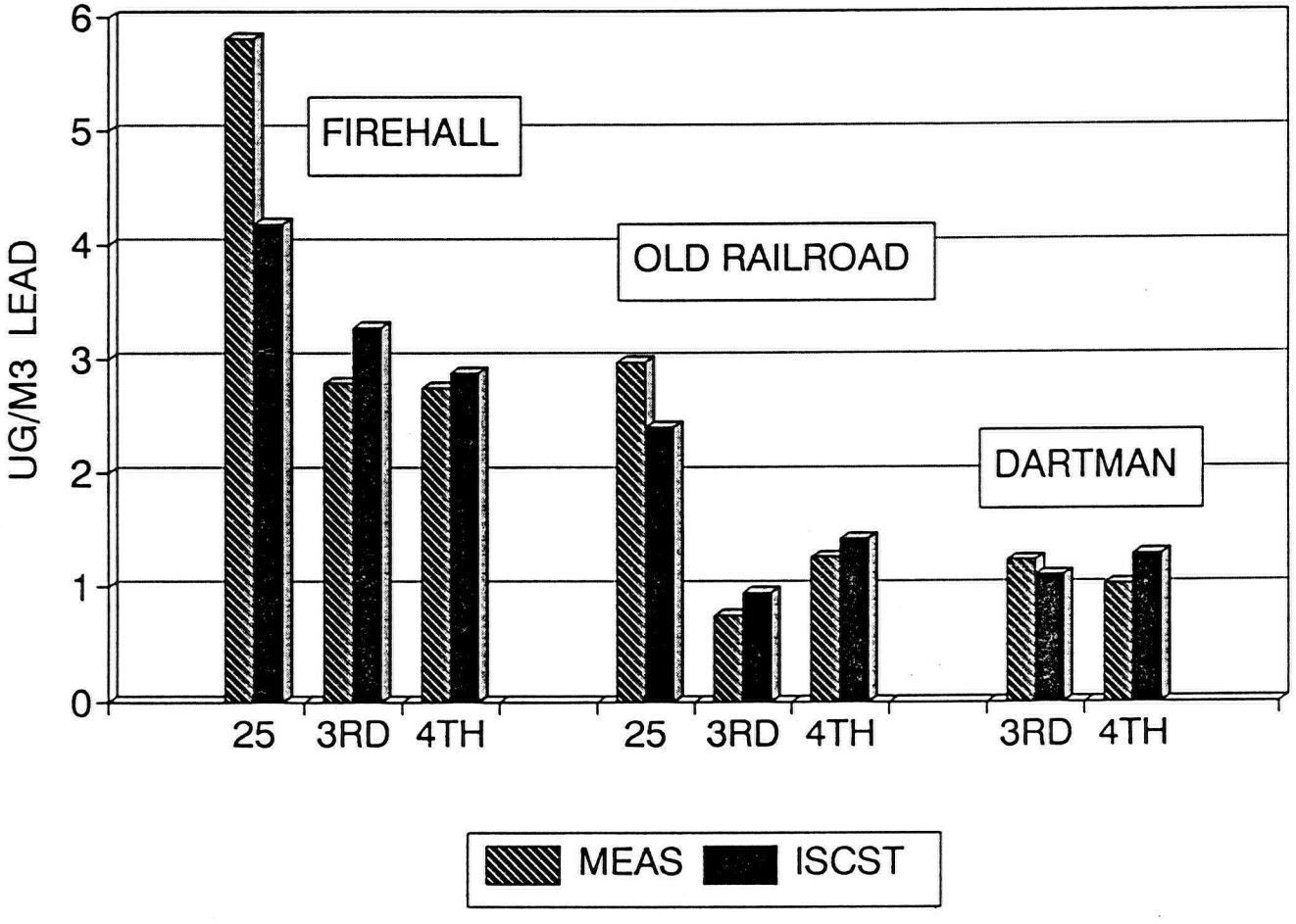
SC #	Description	Iter[a]	Avg. CMB SCE (%)[b]	Avg. ISCST SCE (%)[b]	Averages Overlap?	% Daily Overlap	Average PDC[c]
1	Sulfate Sources	I	0.00 ± 0.61	0.01 ± 0.00	Yes	100	0.0
		F	0.00 ± 0.61	0.00 ± 0.00	Yes	100	0.0
2	High Ca Sources	I	2.63 ± 6.17	0.00 ± 0.00	Yes	80	2.2
		F	0.00 ± 6.73	0.00 ± 0.00	Yes	100	0.0
3	Sinter/Acid Dust Handling	I	3.22 ±31.55	26.72 ± 8.02	Yes	76	26.1
		F	12.45 ±27.47	26.32 ± 7.90	Yes	64	28.2
4	East Helena Roads	I	15.95 ± 3.78	36.74 ±11.02	No	32	28.9
		F	17.66 ± 5.20	8.50 ± 2.55	No	24	9.0
5	American Chemet Pyromet	I	0.31 ± 1.49	0.00 ± 0.00	Yes	88	0.3
		F	0.15 ± 1.39	0.00 ± 0.00	Yes	88	0.1
6	Blast Furnace Building	I	8.93 ± 7.90	4.37 ± 1.31	Yes	60	7.9
		F	7.13 ± 6.41	5.81 ± 1.74	Yes	68	6.8
7	Sinter Plant Stack	I	0.00 ±18.96	0.00 ± 0.00	Yes	100	0.0
		F	0.00 ±18.96	0.01 ± 0.00	Yes	100	0.0
8	Speiss Pit Stack	I	1.09 ± 6.26	0.29 ± 0.09	Yes	88	1.1
		F	0.00 ± 6.73	0.20 ± 0.06	Yes	100	0.2
9	Crushing Mill Baghse	I	0.00 ±34.86	4.08 ± 1.22	Yes	100	4.1
		F	0.27 ±34.84	2.93 ± 0.88	Yes	96	3.0
10	Sinter Storage Baghse Stack	I	40.25 ± 7.26	1.35 ± 0.41	No	8	31.0
		F	3.69 ± 7.05	1.14 ± 0.34	Yes	76	3.2
11	Sample Mill Baghse Stack	I	0.00 ± 0.61	0.03 ± 0.01	Yes	100	0.0
		F	0.00 ± 0.61	0.02 ± 0.01	Yes	100	0.0
12	Dross Plant and Bullion Bldg	I	4.49 ±14.72	25.28 ± 7.58	Yes	60	22.6
		F	12.83 ±12.10	23.04 ± 6.91	Yes	60	20.8
13	Barren Ground E. of Smelter	I	0.00 ± 0.61	0.00 ± 0.00	Yes	100	0.0
		F	0.00 ± 0.61	0.00 ± 0.00	Yes	100	0.0
14	Tetrahedrite Drier Baghouse	I	0.00 ± 0.61	0.00 ± 0.00	Yes	100	0.0
		F	0.00 ± 0.61	0.00 ± 0.00	Yes	100	0.0
15	Slag Sources	I	0.00 ± 2.08	6.52 ± 1.96	No	20	6.5
		F	2.32 ± 1.54	1.64 ± 0.49	Yes	64	1.4
16	Zinc Plant to Powerhouse Rd	I	0.00 ± 0.61	0.00 ± 0.00	Yes	100	0.0
		F	0.00 ± 0.61	0.00 ± 0.00	Yes	100	0.0
17	Tetrah. Drier to Intersect. Rd	I	0.00 ± 0.61	0.00 ± 0.00	Yes	100	0.0
		F	0.00 ± 0.61	0.00 ± 0.00	Yes	100	0.0
18	CSHB Area Roads	I	0.00 ± 0.61	0.05 ± 0.01	Yes	100	0.0
		F	0.00 ± 0.61	0.03 ± 0.01	Yes	100	0.0
19	Motor Vehicle	I	0.00 ± 1.65	0.37 ± 0.11	Yes	100	0.4
		F	0.00 ± 1.65	0.27 ± 0.08	Yes	100	0.3
20	CSHB Baghouse/Sinter Building	I	0.00 ±28.74	5.94 ± 1.78	Yes	100	5.9
		F	0.00 ±28.74	6.67 ± 2.00	Yes	96	6.7
21	Crushing Mill & Matte Handling	I	0.00 ± 6.73	1.73 ± 0.52	Yes	100	1.7
		F	6.42 ± 5.79	3.15 ± 0.94	Yes	76	4.5
22	Miscellaneous Sources	I	22.38 ± 4.45	7.59 ± 2.28	No	20	12.5
		F	34.62 ± 9.89	29.22 ± 8.76	Yes	44	25.0
23	Exclusive CMB Sources	I	2.64 ± 0.72	na			
		F	0.02 ± 0.02	na			
24	Exclusive DM Sources	I	na	1.69 ± 0.51			
		F	na	1.32 ± 0.40			

[a] I - Initial model results (**CPP, 1991; Keystone/NEA, 1991a**)
F - Final model results (this report)

[b] Model apportionments in terms of percent of measured ambient lead (CMB) and percent of compliance lead (DM) apportioned in each model.

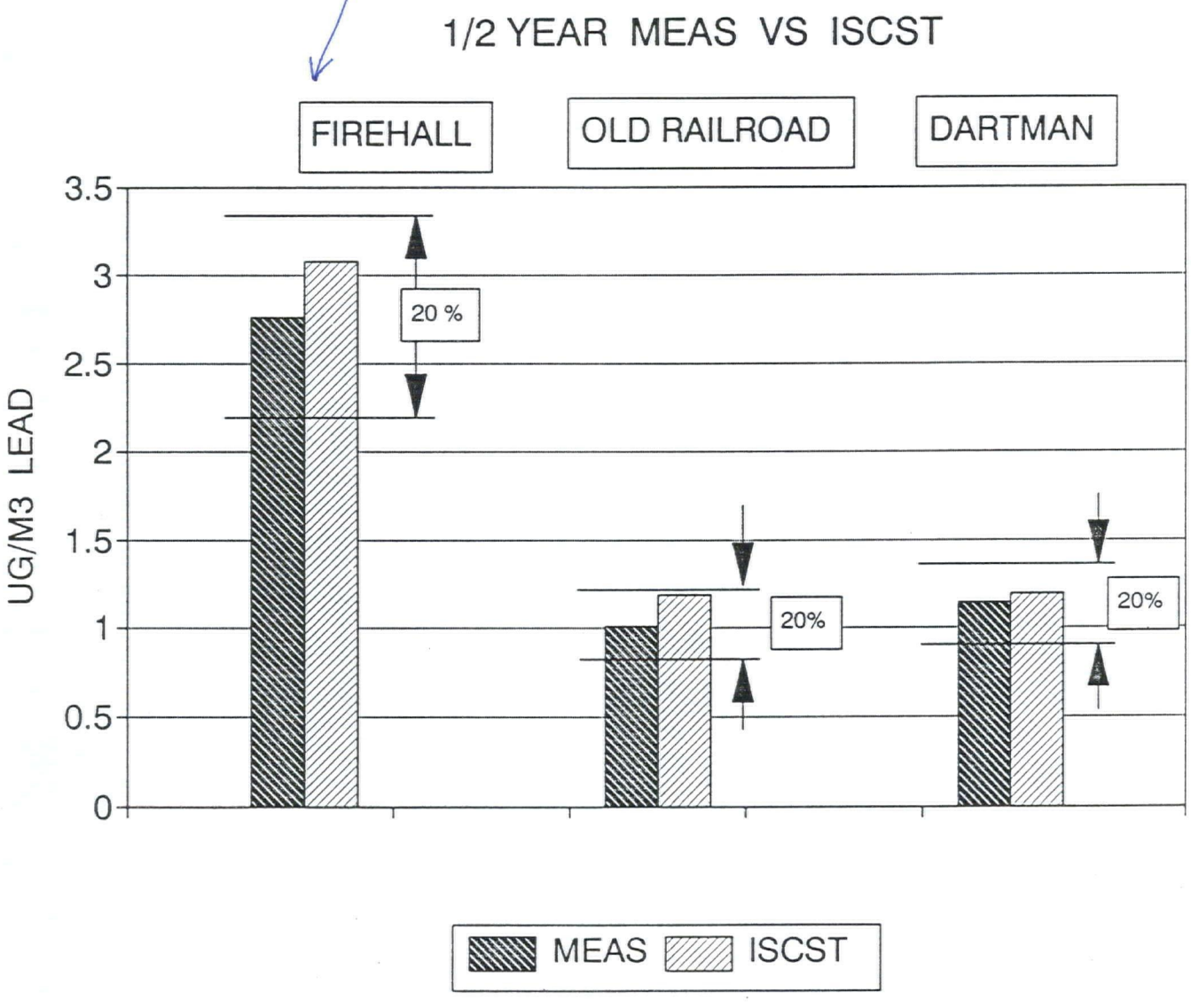
[c] Average absolute value of the daily PDCs (PDC = Percent difference relative to compliance lead concentration = [(ISCST - CMB)/Compliance lead]*100%) when SCEs are in $\mu g/m^3$.

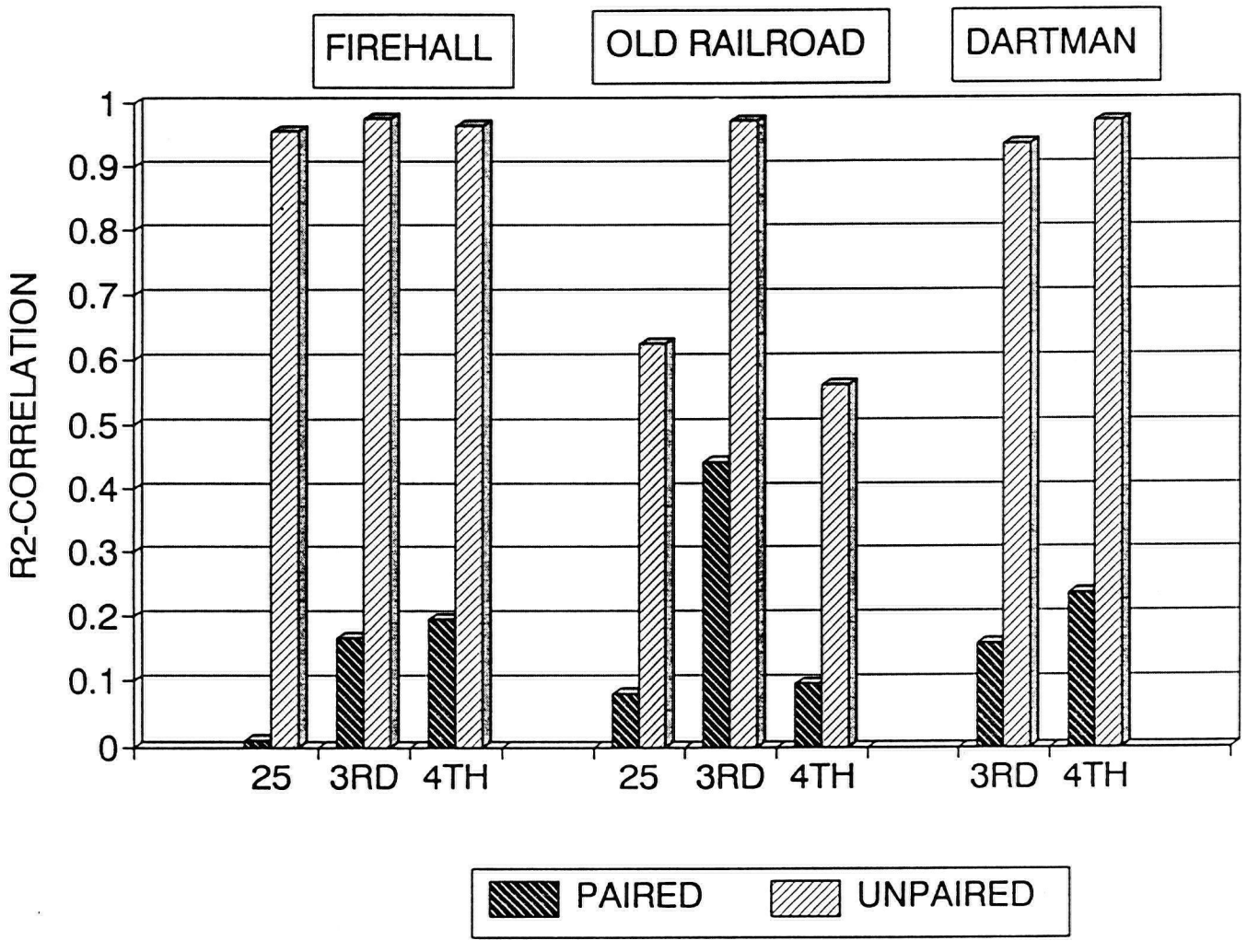
COMPARISON OF MEASURED WITH ISCST



CPP

Question


1/2 YEAR MEAS VS ISCST
FIREHALL
OLD RAILROAD
DARTMAN
UG/M3 LEAD
3.5
3
2.5
2
1.5
1
0.5
0
20 %
20%
20%
MEAS
ISCST


PAIRED AND UNPAIRED CORRELATIONS
FIREHALL
OLD RAILROAD
DARTMAN
R2-CORRELATION
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
25
3RD
4TH
25
3RD
4TH
3RD
4TH
PAIRED
UNPAIRED

Dispersion Model vs 2nd Goal

3rd & 4th Quarters 1990

CPP

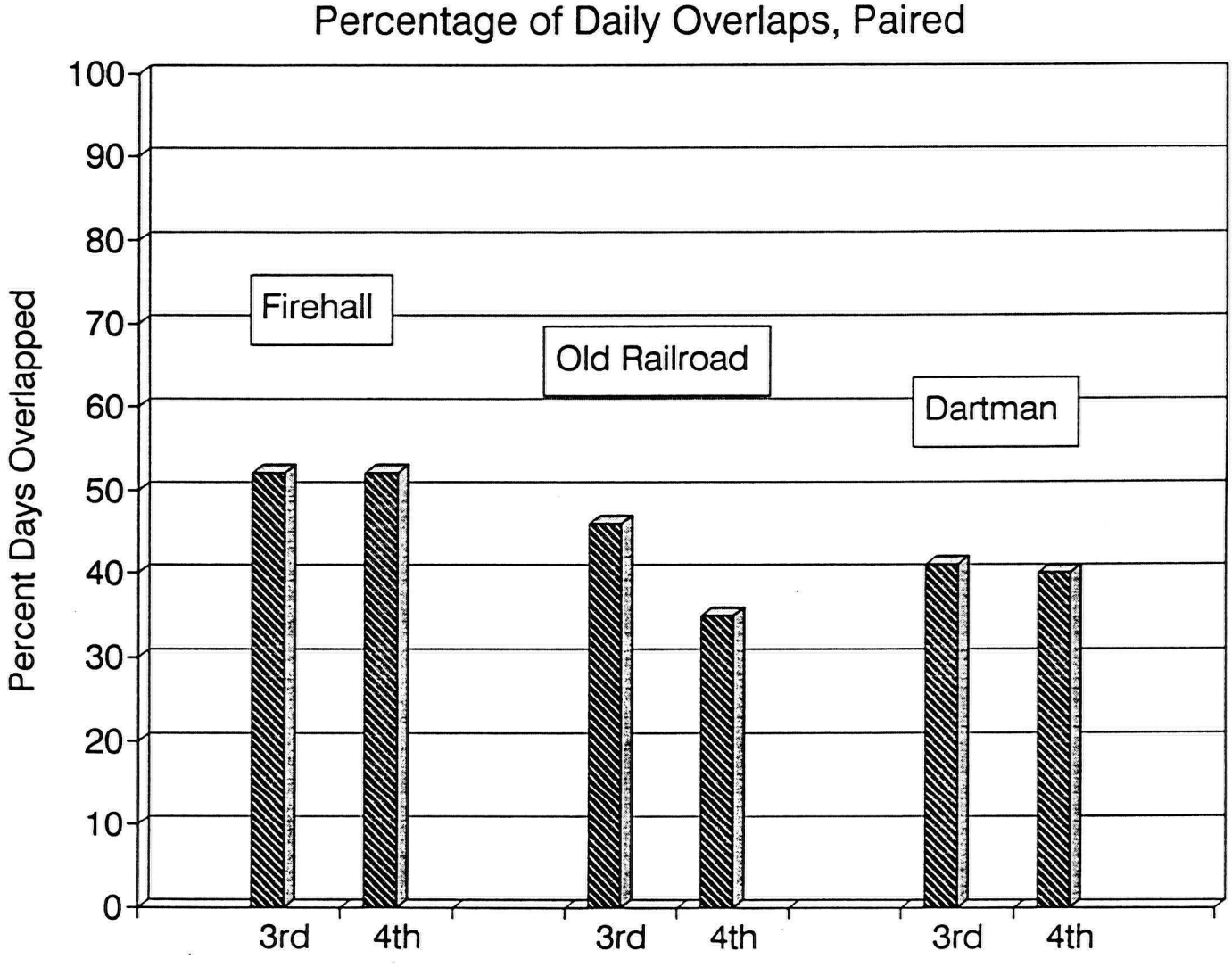

Percentage of Daily Overlaps, Paired
Percent Days Overlapped
100
90
80
70
60
50
40
30
20
10
0
Firehall
Old Railroad
Dartman
3rd
4th
3rd
4th
3rd
4th

FIGURE 6.1

Average ISCST Model Lead Apportionments
Firehall – 3rd & 4th Quarters, 1990

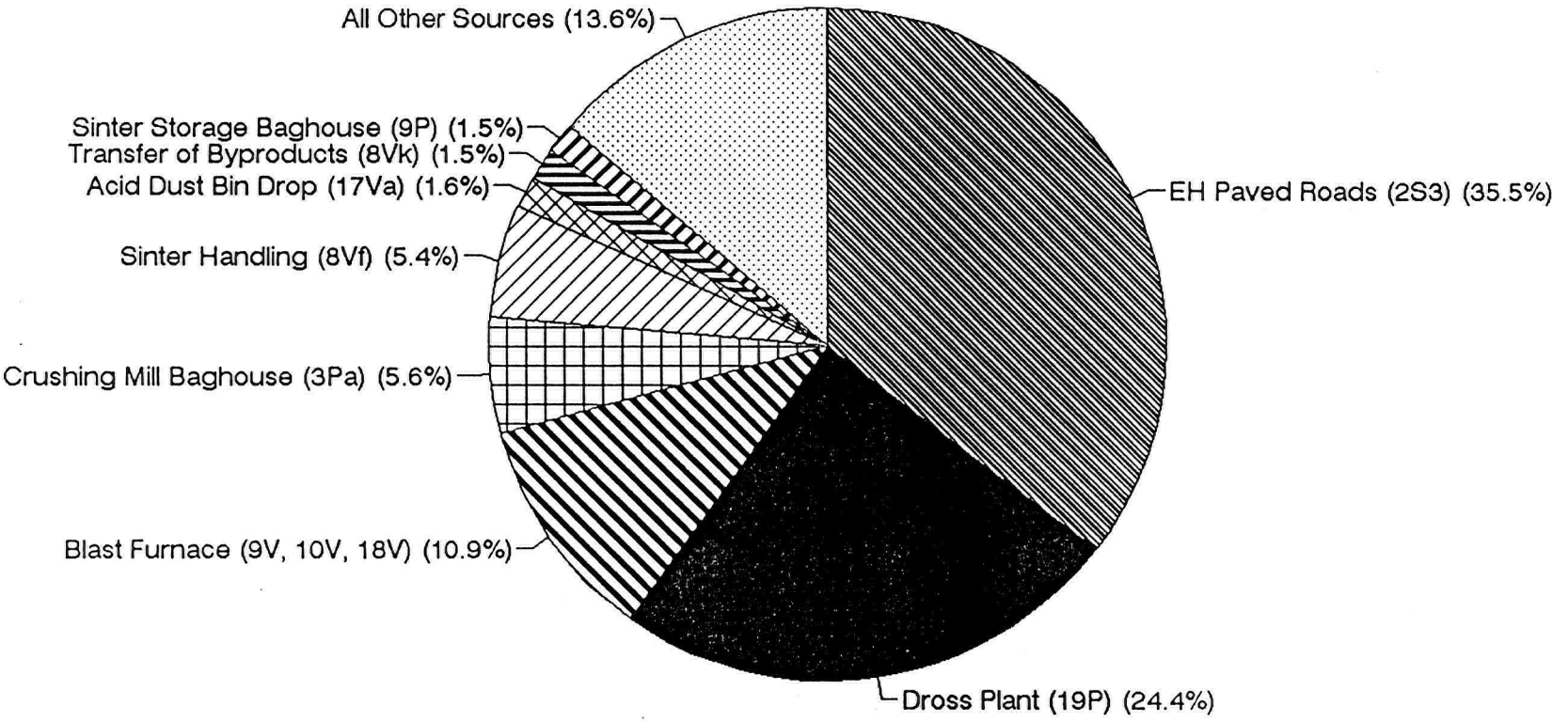


FIGURE 6.2

Average ISCST Model Lead Apportionments
Old Railroad – 3rd & 4th Quarters, 1990

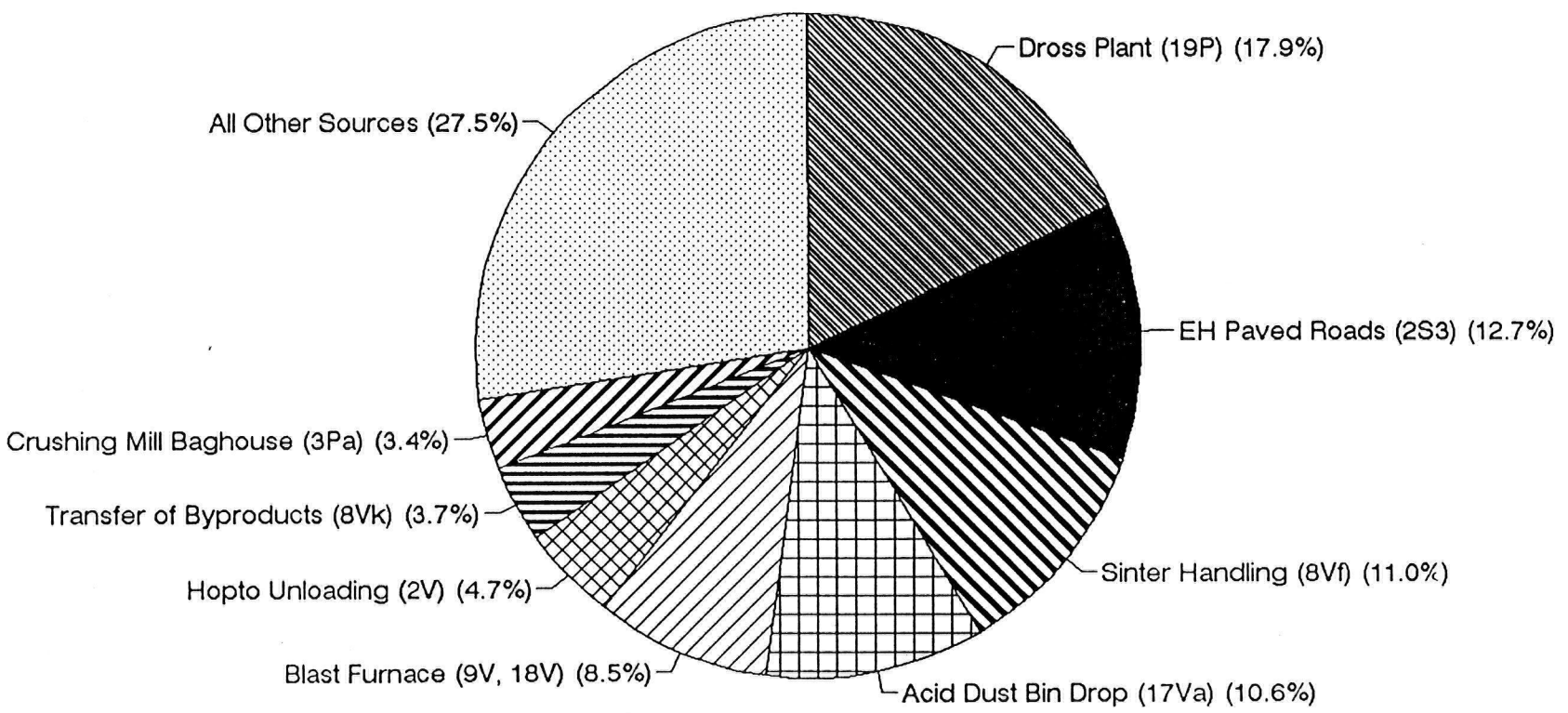


FIGURE 6.3

Average ISCST Model Lead Apportionments
Dartman – 3rd & 4th Quarters, 1990

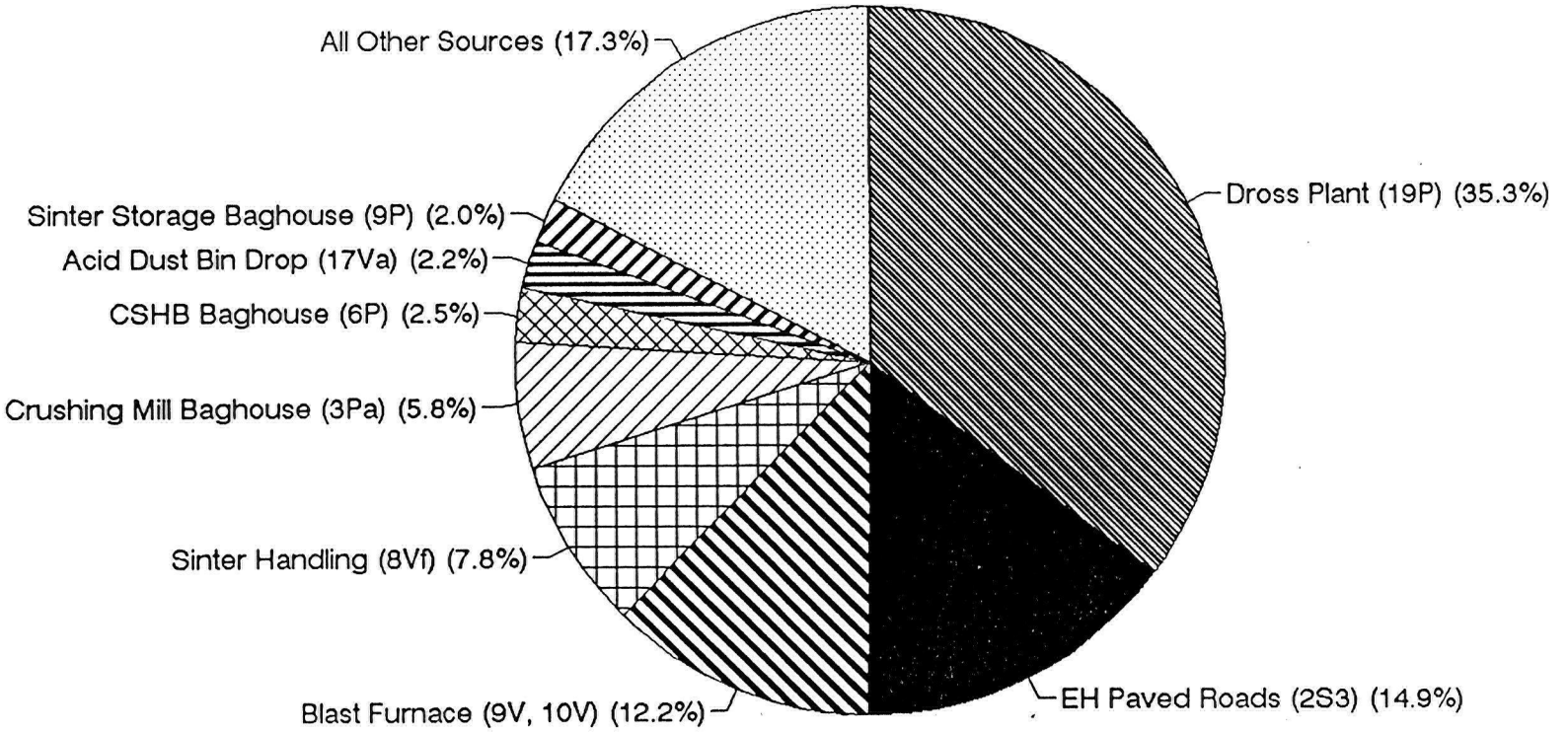


Table 1 (Draft)

Summary of Daily and Annual Emissions from ASARCO, East Helena

Source Number	Source Description	(1) Daily Lead Emission (pounds per day)	(2) Annual Lead Emissions (pounds per year)	Percent Annual Lead Emissions
1P	Sample Mill Baghouse Stack	0.0376	13.72	0.02
2P	Laboratory Assay Stack	0.1411	51.50	0.06
3P	Crushing Mill Baghouse Stack #1 Venting Crusher	0.0493	17.99	0.02
3P-a	Crushing Mill Baghouse Stack #1 Venting Sinter	6.1296	2237.30	2.78
4P	Crushing Mill Baghouse Stack #1 Venting Crusher	0.0177	6.46	0.01
4P-a	Crushing Mill Baghouse Stack #1 Venting Sinter	0.1337	48.80	0.06
5P	Crushing Mill Baghouse Stack #3	0.0038	1.39	0.00
6P	Concentrate Storage & Handling Building Baghouse Stack	95.5992	34893.71	43.43
7P	Sinter D&L Baghouse Stack	10.5204	3839.95	4.78
8P	Acid Plant Stack	0.4144	151.26	0.19
9P	Sinter Storage Baghouse Stack	2.0724	756.43	0.94
10P	Tetrahedrite Drier Baghouse Stack	0.0054	1.97	0.00
11P	Kettle Vent #1 and #3	0.2773	101.21	0.13
12P	Kettle Vent #2, #4, and #5	0.4159	151.80	0.19
13P	Kettle Vent #6	0.1386	50.59	0.06
14P	Kettle Vent #7	0.0608	22.19	0.03
15P	Speiss Pit Stack	0.2781	101.51	0.13
16P	Blast Furnace Baghouse Stack	27.8663	10171.20	12.66
17P	Acid Dust Bin Baghouse Stack	1.4110	515.02	0.64
18P	Zinc Furnace Baghouse Stack	0.0000	0.00	0.00
1V	Crushing Mill Area Building Source	1.4900	543.85	0.68
1V-a	Crushing Mill Area Track Hopper	0.2388	87.16	0.11
1V-b	Crushing Mill Area Product Conveyor	0.1200	43.80	0.05
2V	Hopto Unloading and BF BH Dust Handling	0.5094	185.93	0.23
3V	Old Ore Storage Yard	0.7203	262.92	0.33
4V	High Grade Building Dumping Area	0.0004	0.15	0.00
6V	Sinter Building	1.6869	615.72	0.77
7V	Cottrell Penthouse	1.0352	377.85	0.47
8V-a	Breaking Floor Building	0.0981	35.81	0.04

Table 1 (Draft) Continued

Summary of Daily and Annual Emissions from ASARCO, East Helena

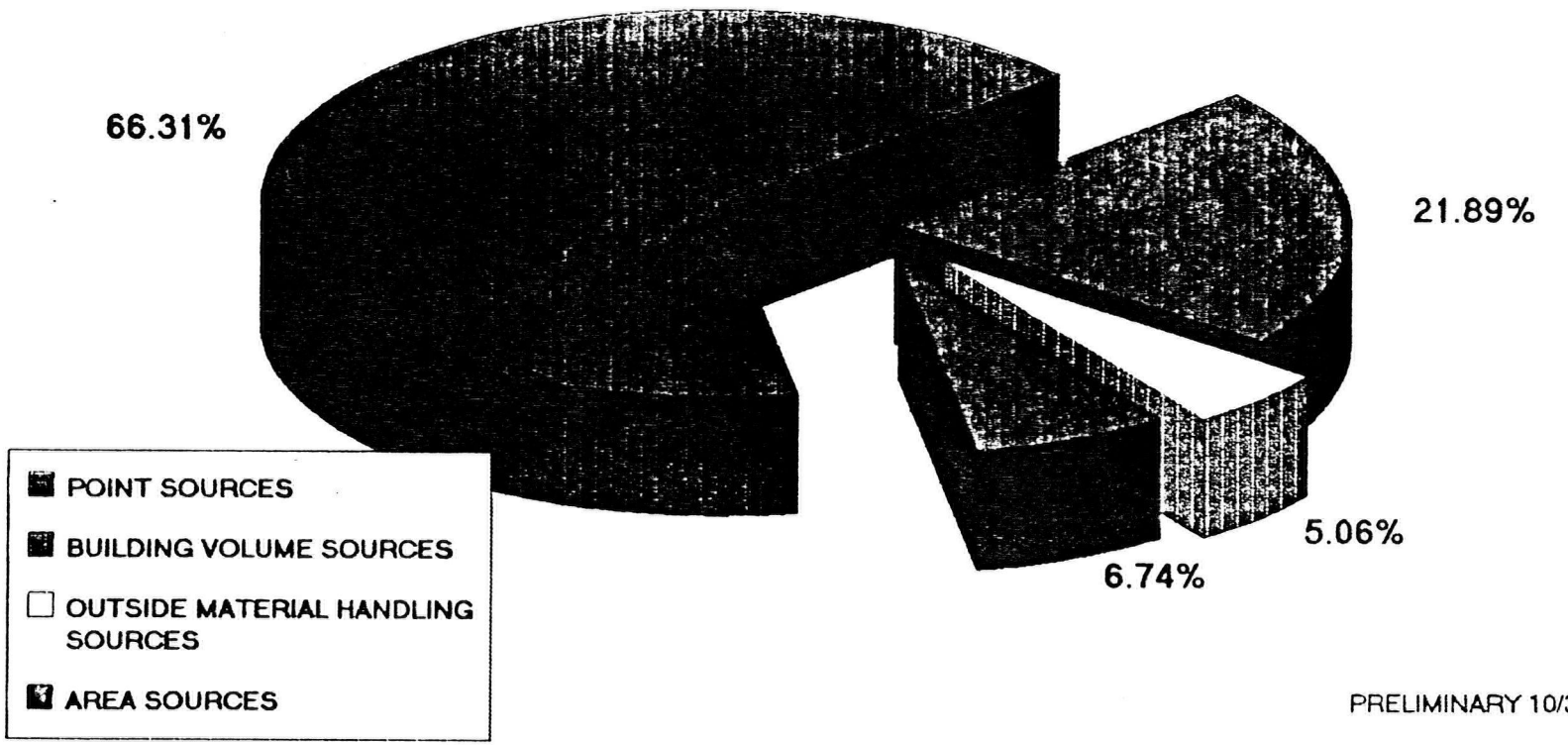
Source Number	Source Description	(1) Daily Lead Emission (pounds per day)	(2) Annual Lead Emissions (pounds per year)	Percent Annual Lead Emissions
8V-b	Blast Furnace Charge Building	0.1804	65.85	0.08
8V-f	Sinter Handling by Payloader	5.485	2002.03	2.49
8V-h	Matte Handling by Payloader	0.1855	67.71	0.08
8V-i	Direct Smelt Bins	0.0011	0.40	0.00
8V-k	Transfer of Byproduct Dust to 47 Feeders	1.0039	366.42	0.46
9V	Blast Furnace Feed Floor	3.8127	1391.64	1.73
10V	Blast Furnace Tapping Platform	1.9081	696.46	0.87
11V	Slag Handling Facility	0.7399	270.06	0.34
12V	Slag Pile Dumping	0.7928	289.37	0.36
13V	Dross Plant	37.4318	13662.61	17.01
15V	Speiss Handling Facility	0.0100	3.65	0.00
16V	Transfer of Tetrahedrite to Drier Bin	0.0004	0.15	0.00
17V	Acid Dust Bin Building	0.2992	101.62	0.13
17V-a	Acid Dust Bin Building Conveyor Drop	1.3745	501.69	0.62
18V	Blast Furnace Baghouse Cleanout	0.5780	210.97	0.26
19V	Blast Furnace Flue Cleanout	0.0584	21.32	0.03
20V	Zinc Plant Building	0.0000	0.00	0.00
21V	Zinc Baghouse Building	0.0000	0.00	0.00
1A	Wind Erosion Sources	0.8129	296.71	0.37
2A	Unpaved Roads	0.2935	107.13	0.13
2A	Paved Roads	13.6883	4996.23	6.22
Total		220.1	80339.2	

(1) Average daily lead emissions per source for period of July 1, 1990 to December 31, 1990.

(2) Average daily lead emissions for the base period times 365 days per year.

ASARCO EMISSION CONTRIBUTIONS BY SOURCE TYPE

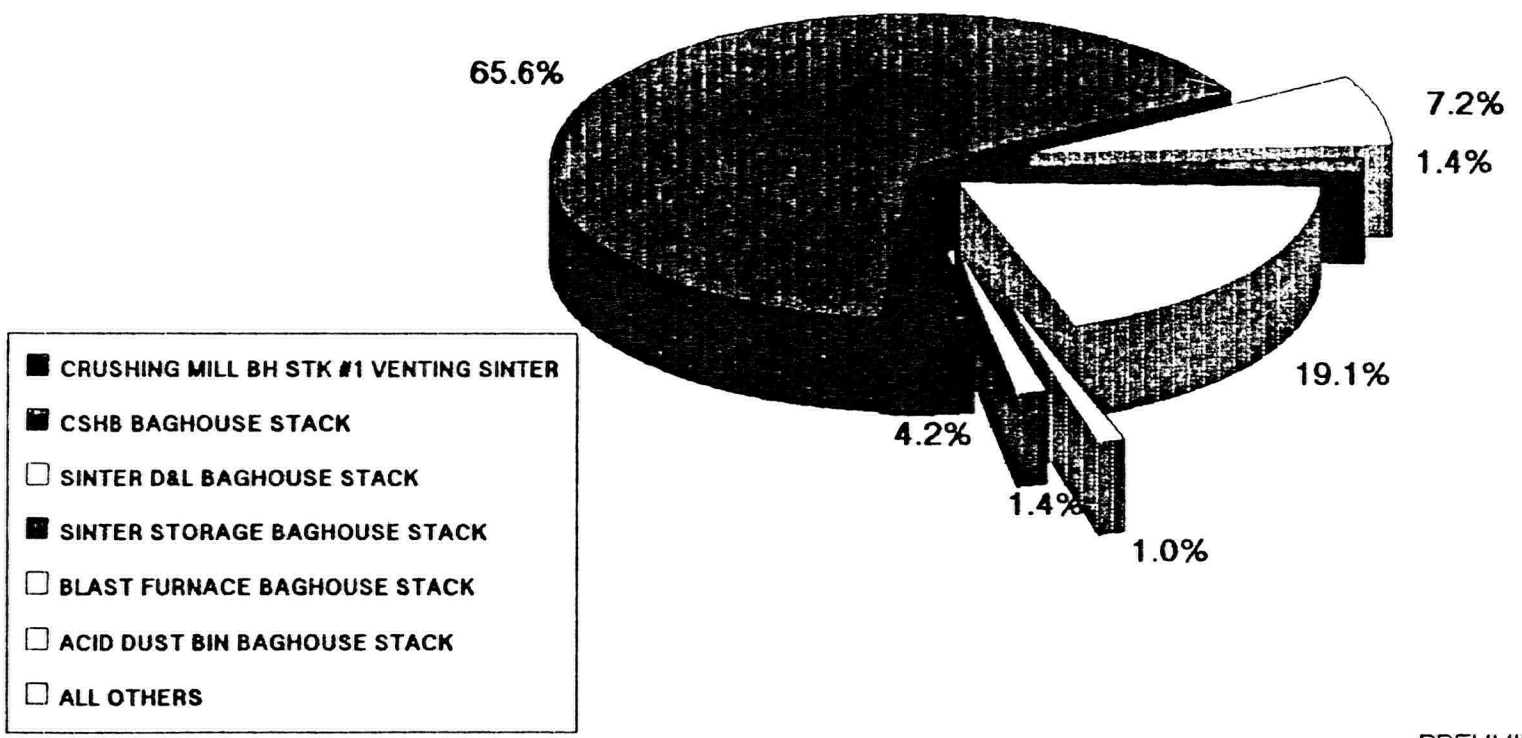
TOTAL EMISSIONS FROM ALL SOURCES = 219.5 LBS/DAY



PRELIMINARY 10/31/1991

ASARCO POINT SOURCE EMISSION CONTRIBUTIONS

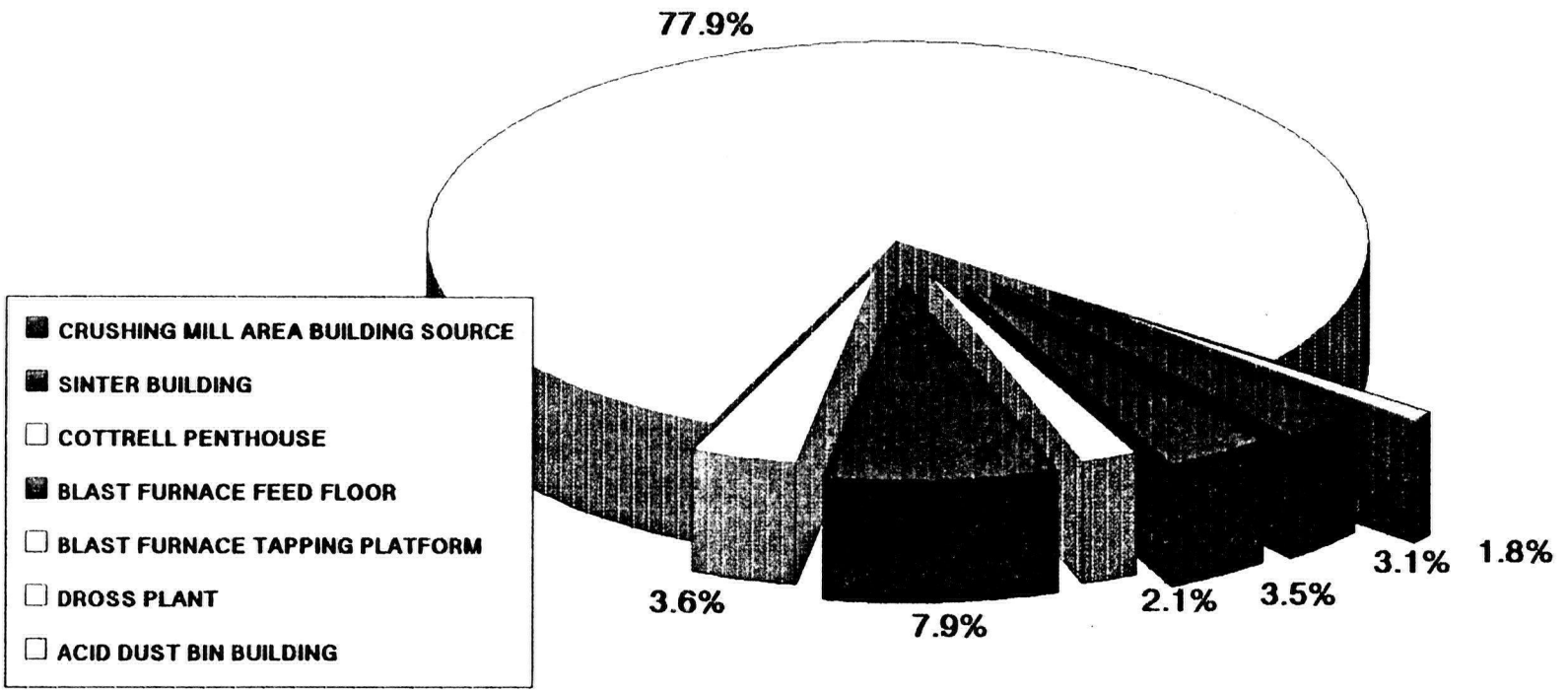
TOTAL EMISSIONS FROM ALL SOURCES = 145.6 LBS/DAY



PRELIMINARY 10/31/1991

ASARCO BUILDING VOLUME SOURCE EMISSION CONTRIBUTIONS

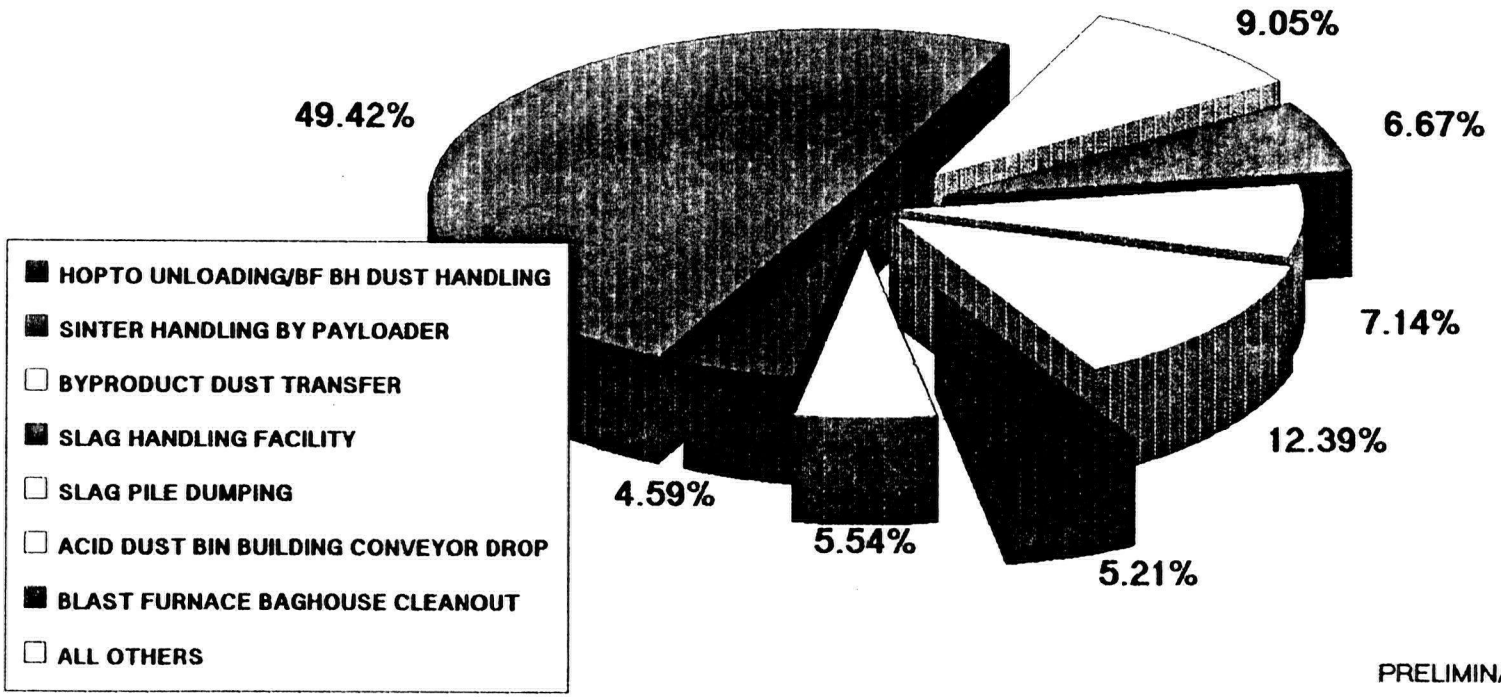
TOTAL EMISSIONS FROM ALL SOURCES = 48.1 LBS/DAY



PRELIMINARY 10/31/1991

ASARCO OUTSIDE MATERIAL HANDLING SOURCE EMISSION CONTRIBUTIONS

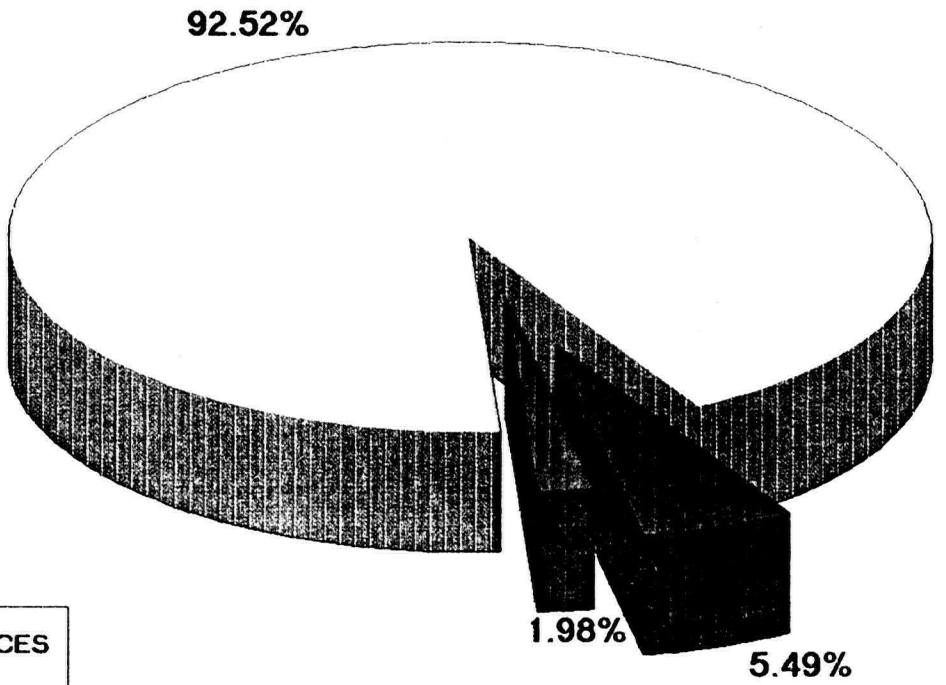
TOTAL EMISSIONS FROM ALL SOURCES = 11.1 LBS/DAY



PRELIMINARY 10/31/1991

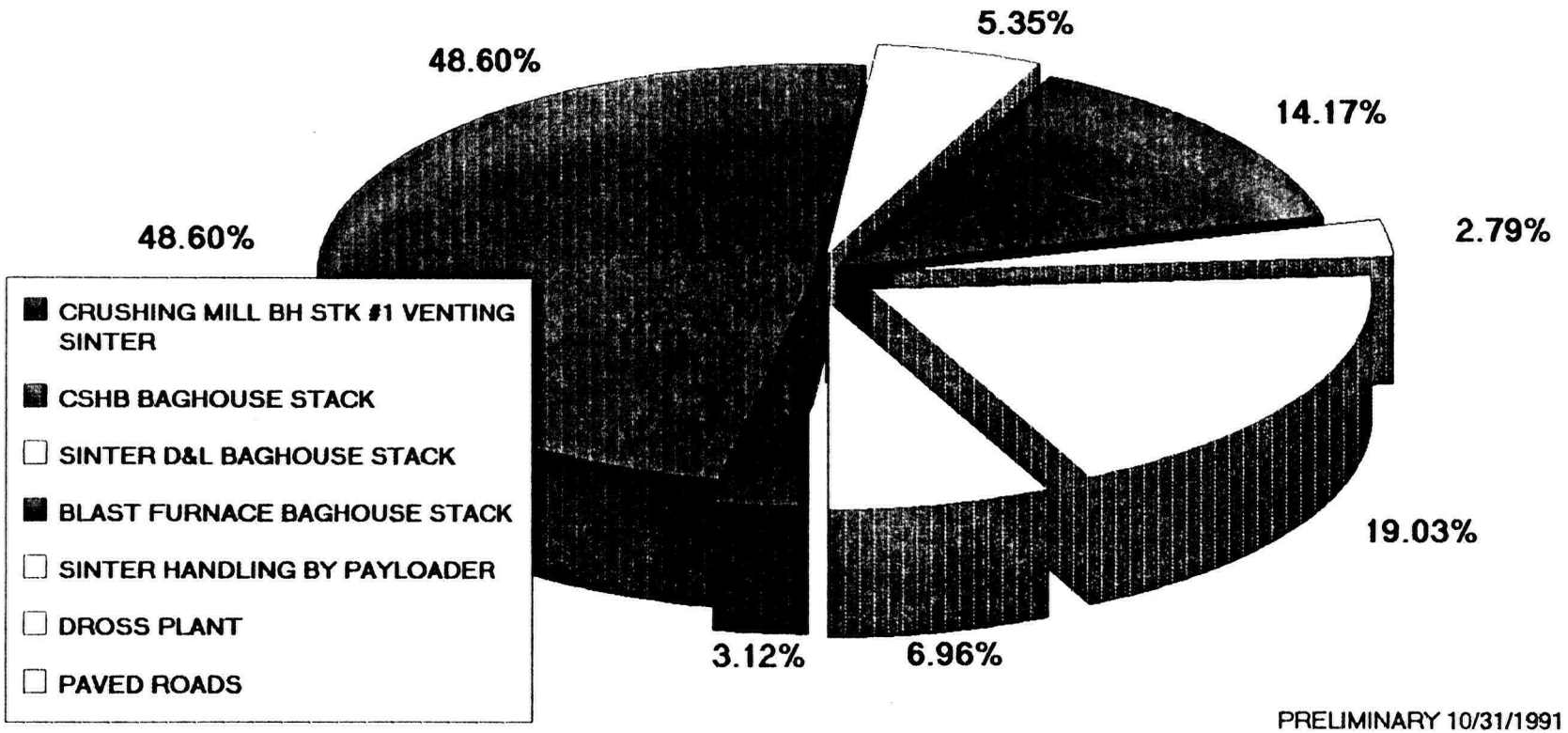
ASARCO AREA SOURCE EMISSION CONTRIBUTIONS

TOTAL EMISSIONS FROM ALL SOURCES = 14.8 LBS/DAY



PRELIMINARY 10/31/1991

ASARCO EMISSION CONTRIBUTIONS BY MAJOR SOURCES
(90% OF TOTAL EMISSIONS)



PRELIMINARY 10/31/1991